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Machinery for Deep Sea Soundings.

The United States steamer Tuscarora, which is now engaged in searching for a suitable berth for a trans-Pacific cable from San Francisco to Japan via the Aleutian Island chain, has been fitted by the Navy Department, under special instructions from the Bureau of Navigation, with a number of appliances for sounding in deep water, including the machine and dynamometer invented by Sir William Thomson, for the use of piano wire, which has already been successfully tried about forty miles outside of San Francisco, in depths ranging from 141 to 1,949 fathoms. Besides, Commander G. E. Belknap has made an improvement on the apparatus hitherto thought best adapted for bringing up specimens of bottom, of which he has sent a model to the Bureau of Navigation, which is much admired by all officers who have seen it. Belknap's improvement in the Brooke's self-detaching shot apparatus for bringing up particles of bottom in quills consists of two cylinders, fixed one above the other when the instrument is set and descending through the water, and to close telescopically when the shot detaches on reaching the bottom. The lower cylinder is fitted with a conical cup at the lower extremity for the reception of parts of the bottom through an aperture, which, while descending, admits a flow of water upward through the cylinders by means of valves which close hermetically by the pressure of the water when the apparatus is being hauled up from below. The upper cylinder covers the aperture in the lower one on detaching the shot, so that the water cannot wash out the bottom caught in the conical cup. Thus Commander Belknap has discovered a practical and unfailing method of not only bringing up safely a larger amount of bottom from the ocean bed than has hitherto been brought up, but also as much water as is caught between the two valves in the lower cylinder at the moment of striking the bottom.

A Great Silver Mine.

The Crown Point Mine on the Comstock lode has achieved results during the last three years which give it a prominent place among the great mines of the world. The bullion statement according to assay certificates amounts to

Value of gold	$4,581,284.01
Value of silver	5,780,899.59
Assay grains	54,744.67
Reclamation, &c.	1,671.53
	10,418,599.80

This was the product of 238,548 tons of ore, quite unequally distributed over the three years. In 1871, only 21,087 tons were worked, and the average yield was $22 38 a ton In 1872, 80,567 tons yielded an average of $43 48, and in the fiscal year ending May 1, 1873, there was no less than 136,893 tons treated, and the average product was $47 05. The average of the three years is $43 63 a ton. The sudden increase in the value of the ore which took place not long ago was taken advantage of and, by increasing the amount extracted at the same time, the mine was made to yield in the last fiscal year more than seven times its product two years before.

As is usual with the mines on this lode, the ore was treated at a number of custom mills, and the statement for 1873 is as follows :

Mill.	Tons.	Average.	Total.
Rhode Island	15,064	$45.20	$681,092.13
Petaluma	11,067	52.28	578,685.31
Mexican	31.923	45.54	1,453,889.15
Brunswick	35,447	45.97	1,629,726.66
Morgan's	13,790	47.61	655,589.04
Pioneer	10,153	47.74	484,746.42
Atlas Mill	5,494	55.12	308,275.94
Sapphire	6,874	45.89	315,949.15
French	1,004	35.92	36,087.02
Spring Valley	2,565	31.94	79,535 93
Gold Hill Quartz	856	53.75	46,022.46
Woodwarth	1,279	72.83	91,192.65
Douglas	1,371	58.40	80,083.03
	136,893	47.05	6,441,974.80

The alloy, as extracted by amalgamation, consisted of gold 44 and silver 56. What the proportions were in the assay buttons we have not learned. The cost of mining was $8 63, and the cost of milling $11 74. The sum of $2,180,000 was paid in dividends in 1873, and $1,260,000 in 1872. At present the assets of the mining company foot up no less than $2,294,244, and its liabilities are *nothing*. Only a few years ago it was known as a "prospecting mine." That is, it had no ore to speak of and did not pay expenses. But two years ago it struck a great *bonanza*, and since that day its history is remarkable, as the figures above given show.

The superintendent, in speaking of this *bonanza*, says it may be briefly described as an immense wedge-shaped body of ore, with its thinner edge uppermost, having a strike or course of N.W. and S.E. and penetrating the earth with an easterly dip of about 36 deg. This body on the 1,300 feet level is 360 feet in width, and has an average breadth of 90 feet, and is by far the richest level ever opened on the Comstock ledge ; the ore on this ledge averages $75 per ton. The 1,300 feet level has already yielded almost $4,000,000, and will probably yield $10,000,000 more, 75 per cent. of which will be clear profit. The body has steadily increased in length, width, and richness from the 900 feet level, where the upper edge was found, down to the 1,300 feet level. From this body they have taken out and crushed from May 1st, 1870, to May 1st, 1873, 217,431 tons, which have given an average yield of $45.73—aggregating $9,944,733. Since December, 1870, when the ore body was first discovered, and the Crown Point was only a prospecting mine, the shaft has been enlarged by sinking another compartment 1,100 feet deep, and double cages have increased the working capacity. Three new 80-horse power engines have been put on the hoisting works. During the fiscal year, 275 feet of raises were made ; 1,289 feet of winzes sunk ; 1,330 feet of cross-cuts run ; 3,826 feet of drifts run, and 700 feet of drifts were retimbered. In 1872 lumber and timber was used amounting to 2,920,000 feet. During the last fiscal year there were used 4,760,000 feet being an increase of 1 840,000 feet for the year.

The expense account of the mine has been for the three years

	1871.	1872.	1873.	Total.
Labor	$155,560.00	$362,739.99	$771,317.25	$1,289,617.24
Lumber	28,974.21	72,793.39	175,522.07	277,289.67
Wood	35,281.11	50,262.85	66,858.37	152,402.29
Supplies, Castings, etc.	35,286.30	90,873.82	170,928.96	297,089.08
				$2,016,298.28

To this must be added $81,911 for improvements on mines. The Rhode Island mill, owned by the company, has cost during the same time

Labor	$8,183.00	$30,907.83	$35,537.25	$74,628.13
Wood	5,933.12	29,778.25	40,744.85	79,456 22
Quicksilver, Castings, &c.	17,136.04	48,644.75	65,107.22	130,888.01
				284,972.36

The improvements on this mill for the three years aggregated $17,872.

A New Method of Sinking Shafts.

By Eckley B. Coxe.*

WITH SUPPLEMENT.

CONCLUDED.

The holes in that part of the shaft which has been sunk preserved their vertical direction until they reached a small vein of coal, where, although remaining in the vertical plane at right angles to the strike, they were deflected towards the floor of the vein, as shown in Fig. 20, the angle of deflection being about two degrees. This deflection is due to the fact that when the drill reached the top of the vein, which dipped at an angle of about 60 degrees and was softer than the rock, it inclined toward the side offering the least resistance. Thus far the deflection has been so slight that it was only necessary after the nine central holes had been fired to put a larger charge of dualin in the holes on the side CD than in the vertical holes, and a smaller charge in the holes on the side AB. In the first case (CD) the dualin shattered the rock behind it, and it was possible to keep that side of the shaft vertical without resorting much to hand blasting. In all other parts of the shaft the holes went down in a perfectly vertical direction. The corners of the shaft are exactly where the four corner holes went down, and the sides of the shaft look as if they had been trimmed up, although in reality nothing of the kind has been done. The sides have very much the appearance of a stone which has been broken by a plug and feather. The shaft is timbered

* A Paper read at the meeting of the American Institute of Mining Engineers held May 21st, 1872.

as the work proceeds, yellow pine timber 12 inches×12 inches, placed at first skin to skin, and afterwards 2 feet apart, being used below the iron girders. The guides are of California yellow pine, and are put in as the work proceeds. The bucket used for taking out the stuff will be guided as is shown in Fig. 25. Two buckets will be used and there will be shields above them to catch anything that may fall in the shaft, (see Fig. 24,) so as to protect the workmen. The bucket is made of iron, holds from one to two tons of rock, and has two trunions placed opposite to each other a little above its center of gravity. When the bucket is raised to the surface, a truck (Fig. 21, Fig. 22 and Fig. 23) is run under it on a railroad passing over the shaft, and the bucket is then lowered into the Y shaped rests. The rests are supported on a turn table which allows the bucket to be revolved in a horizontal plane, and, by means of the lever A, the bucket, being suspended nearly at its center of gravity, can easily be overturned and emptied. This apparatus is simple and works admirably. By having several trucks and buckets, the stuff can be hoisted and disposed of very quickly.

In the East Shaft with eight machines, the 25 holes can be bored in about one month. In the West Shaft with from 8 to 10 machines, the 35 holes can be drilled in about six weeks. The East Shaft was sunk from April 15th to May 15th of this year, (1872) seventy-six feet, and during this time 12 days (5 in April and 7 in May) were lost, that is to say, there was no blasting done from want of timber, and from want of fresh air, in consequence of the brattice not having been built near enough to the bottom of the shaft. In blasting in the East Shaft, 2 miners, 3 laborers and 1 chargeman are employed on each shift. There are three shifts of eight hours each per day.

In the first 300 feet drilled in the West Shaft the rock was hard; in the East Shaft it was principally soft rock and slate. The plan of boring the holes to a depth of 300 feet at once, filling them with sand and then using portions of them, as wanted, for blasting was first suggested by Mr. SHELLEY, formerly superintendent of the William Penn Colliery in Schuylkill County. Mr. BULLOCK, formerly superintendent of the Pennsylvania Diamond Drill Company, took up the idea and suggested it to Mr. PLEASANTS. After carefully considering the question and testing it, Mr. PLEASANTS recommended Mr. GOWEN to sink the two deep shafts with the diamond drill in this manner, and upon his advice the company decided to try it. After this endorsement of Mr. PLEASANTS' and the decision of the company, Messrs. SHELLEY and BULLOCK patented their process of "drilling deep holes, filling them with sand, and firing them in sections." The patent now belongs to the Pennsylvania Diamond Drill Company.

As soon as he had decided to use this process, Mr. PLEASANTS became satisfied that the form of engine then employed with the diamond drill was too large and unwieldy for use in the confined space at the bottom of a shaft, where several of them would be in operation at one time; he therefore determined to use the Root rotary engine to drive the drill, and employed the superintendent of the Pennsylvania Diamond Drill Company, Mr. BULLOCK, to carry out his idea of a small, compact drilling machine to be attached to such an engine. The plan, when completed, was submitted to two of the best machinists in Schuylkill County, who suggested some slight modifications. The plan finally adopted has been given in what precedes. Nine of these machines have been constructed by Messrs. ALLISON and BANNAN, of Schuylkill County, for this work. It is, of course, impossible to determine what will be the exact cost of sinking by this method until the work has proceeded much further. The estimate of the cost of the two collieries has not been made public, being, I believe, a confidential communication to the company. As neither the depth of the shaft, nor the exact nature of the strata to be passed through were known, it could only be approximate. Mr. PLEASANTS, however, informed me that he did not consider that the cost per foot of sinking by this method would necessarily be less than by the old one. The great advantage, he says, will be in the saving of time, which, he thinks, will be fully fifty per cent.; this is, of course, a consideration of immense importance in an operation involving the outlay of so much money. Another advantage is that most of the men employed need not be skilled miners. Mr. PLEASANTS considers that the method will be employed with peculiar advantage in sinking shafts of moderate depth (from 200 to 300 feet). In such cases, after a shaft has been sunk through the earth, clay, or wash, to the rock, the machines can be put to work on the surface and the holes bored down to the depth which it is intended to reach by the shaft. The shaft can then be sunk without any hand drilling. The great advantage of this method, where the strata to be penetrated contain large quantities of water, is self evident.

APPENDIX.

SINCE the foregoing paper was read, and before its publication, I again visited the shafts and obtained on April 25th, 1873, the following additional data:

The East Shaft has been finished to a depth of 530 feet, and the holes for 200 feet more have been drilled. The West Shaft has been finished to a depth of 400 feet, and they are beginning to bore the next set of holes. During the last six months the East Shaft has been sunk on an average over 60 feet per month. In one month 80 lineal feet of the shaft was blasted and timbered.

The permanent guides have been put in place in the East Shaft as far as it has been sunk. The two shafts have been connected on the surface by a railroad. Six machines are used in the East Shaft for boring. In place of the screw feed described in the forgoing paper, a new hydraulic feed has been tried with success. The revolving sleeve is placed between two cylinders, in which two pistons, connected with the lower end of this sleeve, move; by admitting water under a greater or less head, by means of a stop cock, the drill can be moved forward as fast or as slow as may be wished, with any required pressure. The shaft has passed the level of the cross-cut, and the water in the shaft has been cut off by forming water-tight gutters around the shaft upon one set of timbers, and from them the water is conducted to the slope. There is not water enough met with below this level to keep the timbers wet. If the slope were not there, and the water had to be pumped from the bottom of the shaft, it would require five lifts of pumps, a Cornish engine, rods, pumps, etc., to raise the water from the bottom of the shaft when the work was completed.

A double acting Alison & Bannan Steam Pump, with fourteen inch plungers has been put into the slope, replacing the Cameron Pump.

A double acting Waring compressor has been erected by which from four to five of the drilling machines, and the steam pumps in the shaft can be driven. Some of the drilling machines are actuated by steam in order to prevent the temperature in the shaft from being too much lowered.

At the Ellangowan Colliery, near Mahanoy City, belonging also to the Philadelphia and Reading Coal and Iron Company, a shaft is now being sunk which will not exceed 300 feet in depth. The holes for the blasting have all been bored from the top to the bottom in one operation.

The East Shaft, which was originally on the south side of the basin, has passed the synclinal and is now cutting through the south, dipping strata; the dip being about 30°. This was predicted by Mr. PLEASANTS, as may be seen by his section Fig. 1 which was made at least a year before the shafts reached the synclinal.

Railroad Accidents in August.

THERE were no less than 150 accidents on the roads of this country in August, causing 63 deaths and wounding 35 persons. The causes of the disasters are classified as follows, by the *Railroad Gazette*:

DERAILMENTS—		
Unexplained		37
Cattle on track		11
Misplaced switch		9
Washing out of road-bed		9
Obstruction washed upon track		3
Obstruction falling from load of car		3
Failure of bridge or tressle		3
Obstruction falling from above road-bed		2
Malicious obstruction		2
Broken rail		2
Spreading of switch		2
Broken axle		2
Broken flange		1
Broken Wheel		2
Fall of brake beam		1
Spreading of rails		1
Open drain		1
Mistaking signal		1
Failure to flag when frog was removed		1
Runaway going through end of track		1—94
COLLISIONS—		
Rear collisions		31
Head collisions		12
Unexplained		10—53
Car crushed by wrecked car		1
Boiler explosion		1
Breaking of driving axle		1
Total		150

The record for the year ending with August is:

Month.	Accidents.	Killed.	Injured.
September, 1872	71	24	104
October	90	29	102
November	103	37	114
December	112	42	133
January, 1873	178	40	199
February	133	25	126
March	112	18	92
April	101	23	88
May	79	10	113
June	90	12	104
July	90	18	80
August	150	63	155
Totals	1,309	341	1,410

This is a fearful array of so-called "accidents," the average being three and two-thirds a day, counting Sundays as full working days. It is impossible to believe that this number is anything like a normal and inevitable proportion. It is true that probably not one train in a thousand meets with a mishap of sufficient importance to be ranked in the above list, and the percentage, therefore, is not very great. But, looking at the grand total, it can hardly be denied that proper measures would very much lessen the evil, and that it is imperatively necessary to ascertain what those measures are. The *Gazette* says: "The report this year shows a shockingly great and unaccountable number of accidents, many of which were exceptionally serious. The freshets of the month might account for some increase, especially in the slighter accidents, and probably the great accidents attracted so general attention to the subject that such casualties were more fully reported in the newspapers; but this cannot account for the enormous number, which was exceeded only in the month of January, when half the railroads in the country were running on snow. And an examination of the several cases indicates that no natural cause special to the time had anything to do with the greatest portion of them, and especially the more serious ones, but there seems to have been an epidemic of disorder and disobedience. Several of the severest were the direct fruit of a clear disobedience of orders,

and in three cases train men were recommended for indictment for criminal negligence, while in one they were actually indicted. A severer discipline seems to be the great lesson taught by the frightful record of the month.

"The railroads in most parts of the country are now having, or beginning to have, their heaviest traffic, and crowding of roads increases danger, while the increase in the number of trains of course multiplies the individuals which are subject to accident."

Coke Ovens.*

By M. AUGUSTUS GILLON, Professor at the School of Mines at Liege.

THE process of carbonizing coal, as it is still practised in Wales and in Staffordshire, has the advantage of dispensing with costly works, and that a comparatively small area of ground is required. On the other hand, there are the drawbacks that bituminous coal must be employed, that the coke obtained is far from uniform, and the percentage obtained is low. Coal which yields in good ovens from 75 to 80 per cent. of coke, gives in ordinary ones only from 60 to 65 per cent. From this it results that the common process of coking is justified only where the cost of construction is very high, and where the price of coal is very low. As this price rises, this process of carbonisation is of necessity abandoned, and coking in furnaces is substituted, as is now the case in England. This stage of transition has long been passed in Belgium, and for many years much attention has been given to improving the form of ovens. In 1852 the output of bituminous coal necessary for the production of coke, according to the means then known, became entirely insufficient in the district of Charleroi, and the prices rose to an alarming degree.

Economy of fuel became absolutely necessary, and the means of coking inferior coals was eagerly sought after. Under the pressure of this necessity a large number of coking ovens were devised, amongst which the industry affected could make selection. Later the same question presented itself imperatively in the district of Liege, and we shall be able to show, in the environs of this city, to the honorable members of the Iron and Steel Institute a complete series of coke ovens in full operation, and which, more or less, satisfy the various intentions the different designers had in view. These problems are those which are encountered in all industrial questions; they touch on the nature of first products, of supply, of quantity, of the expenses of establishment, and hand labor. On this subject we may say a few words before proceeding to the consideration of the different systems of coke ovens.

It has always been easy to produce coke for metallurgical purposes from bituminous coal, but when the production of the latter is not equal to the demand for the former, it becomes necessary to employ coal of inferior quality. In practice the width of the ovens has been gradually reduced, until the coal is calcined in narrow ovens subjected to great exterior heat produced from the adjacent ovens, and by this means inferior coal can be agglomerated and transformed into coke. To obtain an increased duty we have treated the coal in closed retorts, that is to say, without admitting any air into the interior of the ovens. In this case, the gases distilled from the coal circulate in the channels provided around the retort, and are there completely burnt by the admission of a properly regulated supply of hot air. The heat developed by the combustion of these waste gases, cokes the coal very economically. The rapidity in charging and drawing the ovens, and the quenching of the coke, have also a material effect upon the percentage obtained. The uniformity of the coke depends upon the dimensions of the oven, and on the good arrangement of the channels for the hot gases; the use of double doors has also a certain influence. The hardness of the coke depends greatly upon the previous treatment of the coal, and the thickness of the charge in the narrow ovens. Purity is secured by proper washing of the coal. Economy in hand labor has been promoted by the adoption of tramways and small wagons, instead of the old mode of charging with the shovel; by discharging with mechanical means, instead of by hand; by quenching the coke with jets, instead of with buckets. Lastly, the general arrangement of works, established under favorable conditions, presents three series of communications: the first and highest corresponds to the roof of the oven, for the circulation of the wagons for charging; the second, which is at the discharging level, and the third, which is at the hearth for removing the products. The discharging area is immediately above the wagons for receiving the coke. Such is the general arrangement adopted at the most recent works. Lastly, the space occupied by the ovens is a matter of very considerable importance to many manufacturers. The vertical ovens offer very great advantages in this respect.

It would be beyond the limits of this paper to pass in review all the systems of ovens adopted, but we may call special attention to some of those which will be met with around Liege. The old ovens, with plain sides and one door, and which were discharged by rakes, have long since disappeared from Belgium, although a large number are still employed in England. They have here given way to ovens heated at the sides, and discharged mechanically. The best way, perhaps, of illustrating the progress made, is to compare the net prices at the same works before and after the changes were made. It will be seen that these figures are very different from those of to-day; that they date from, so to speak, a remote period. The net price with the old ovens is—1538 tons of coal at 10·78 francs per ton, 16·58 f.; hand labor, 1·00; maintenance, repairs, transport, 0·75 f.; total price per ton of coke, 18·33f. The net price with the new ovens (system Smet) is—1333 tons of coal at 10·78 francs per ton, 14·37 f.; hand labor, 0·66 f.; maintenance, repairs, transport, 0·85 f.; total price per ton of coke, 15·88 f.; showing a difference of 2·45 f. per ton.

The Smet system just mentioned is met with in our environs at Ougrée, at Seraing, at Grivegnie. It is a furnace with two doors, and mechanical discharge. Its ordinary dimensions are: Length, 7m.; width, 0·65 m.; height, 1·60m.; load, from 40 to 50 hectolitres: ordinary time of coking, from 24 to 36 hours. The coal is introduced through hoppers. The gases escape through openings at the springing of the arched top, pass along the sides in two horizontal channels, circulate under the bottom, and then enter the uptake. Certain modifications have been introduced in the arrangement of the channels with a view of reducing the return of the flames, which injure the brickwork, and further to facilitate clearing the corners. The blast furnaces of Ougrée have ovens modified in this way by M. CHENEUX. M. GILBERT, with the same object, has replaced the horizontal channels by vertical ones in several groups of ovens in Hainault. The Smet system, which has been very successful both here and abroad, appears, however, to be giving way before other arrangements, especially those of Dulait, of Coppée, and of Appolt.

In a group of ovens on the Dulait system, the furnaces are placed in pairs, and heat one another. The division by groups of two is also adopted in the Coppée system; it has the advantage that the number of groups in operation can be increased or diminished without interfering with those actually at work. The flames descend direct under the sole of the ovens, where they are divided into four currents, and which afterwards pass through several channels before they are delivered into the uptake. Each chimney has four compartments. The length is 7 m., the height up to the springing of the arch 1·15 m., the rise of the arch 0·10 m., the slope of the sole towards the discharging area 1 in 50. To prevent the loss of heat, the action of the wind, and the entry of air, these ovens are furnished with double doors. The inner ones are of cast iron, the outer, placed on the face of the outer wall, are of wrought iron, ·005 m. thick. Calcination in a closed chamber is one of the principal features of the Dulait system, and, after charging, all the doors are carefully luted with clay. The hoppers for charging have also double protections. The closed chamber gives the greatest duty. But if the air is excluded from the furnace, and does not burn a part of the charge to transform the rest into coke, it is necessary to procure the heat to effect the coking. M. DULAIT, approaching an idea already put in practice by Mr. Cox, of England, consumes the combustible gases disengaged from the coal, and which escape into channels outside the retorts, where they are mixed with currents of air. To effect this, one of the sides of the channel in which the inflammable gases circulate, is formed with two rows of hollow bricks. These bricks have a cross section of ·10 m. and ·12 m.; they are pierced with a longitudinal hole, ·05 m. in diameter, so that when placed in position, one above the other, they form two conduits as long as the channel itself. The lower conduit is open on the forward face of the furnace, and closed at the outer extremity, where it rises and communicates with the upper conduit, which is pierced at intervals with holes ·008 m. in diameter, and which open into the channel where the combustible gases circulate. By this arrangement the exterior air brought in by the draught passes first through the lower conduit, becomes heated, and enters the upper one, where it is thrown among the combustible gases in the channel through the small holes just spoken of. From this arrangement it results that when the coal, from its nature, furnishes a sufficient supply of combustible gas, heat is obtained necessary for distillation, and in order to raise the ovens to the temperature necessary for continuous production, by this system all entry of air is prevented in the furnace, and the maximum percentage of duty is obtained. This suppression of the entry of air is, however, evidently theoretical only, since the exclusion depends on a perfect luting of the doors.

The Dulait system has been extensively tested, and, as is always the case, very contradictory opinions have been advanced upon it; one party maintaining the marked superiority of the arrangement, and the other, while the ingenuity of the system is admitted, assert that it is not suitable for bituminous coals, while others again do not consider that the saving obtained pays for the first outlay of the establishment. At the works of JOHN COCKERILL, of Seraing, they have been abandoned, for it is maintained that the coals of that district give a harder, denser coke in the old ovens, which, moreover, are not half so expensive in first construction. At the works of the Witry Company, at Ougrée, a group of Dulait and a group of Smet ovens have been built for the sake of comparison. The dimensions of a Dulait oven are—length, 7 m., of which 6 m. are occupied with the charge; width, 0.74 m.; charge 2 tons; time of coking, 24 hours; duty, 78 per cent. The dimensions of the Smet oven are—length, 7 m., occupied by the charge of coal; width, 0·68 m.; charge, 2 tons; time of coking, 24 hours; duty, 77 per cent. The first system gives sensibly less smoke than the second. Although the Dulait ovens are more expensive in construction than the others, and are not so easily worked, it has been decided at Witry, all things considered, to adopt them.

The advocates of the Dulait system do not content themselves with the advantages enumerated above, that is to say, when the ovens are worked with care. They object that the coals of the Cockerill Society, during the period of the trials, at Dolhain, at Bracquegnies, and even at Seraing, have never given less than 75 per cent. of coke, instead of 71·34, which this society asserted. Taking a theoretical view, they refuse to admit that furnaces admitting air can give such good results as those entirely closed, when the latter are properly maintained.

At the Witry works, at Ougrée, it is quite true that a greater duty was obtained with the Dulait than with the Smet ovens, but the difference is small, although M. Dulait asserts that on a lengthened trial, and under his own sur-

* Iron and Steel Institute: Liege Meeting.

veillance, a duty higher by three or four units could be obtained. It has often been said that the Dulait ovens require constant watching and great care, which are inconsistent with the habits of the workmen employed, and from this fact arose the sensible difference between the practical and the experimental results. According to M. DULAIT such an assertion is an equivalent to a denial of all industrial progress; he cannot understand that care, by which such important results can be secured, should not be enforced at every establishment, and he concludes by saying that if some manufacturers do not at all times obtain a superior duty in these ovens, it is simply because they do not desire to do so. In support of this, and without going outside the Liege district, we quote the result of the Dolhain and the Tilleur ovens. The Dolhain Society possessed Smet furnaces, of which the mean duty, during five consecutive months, was a little below 71 per cent.; and it afterwards erected 40 Dulait furnaces, which, according to the report of the managing directors for two months averaged 79·17 per cent. of large coke of excellent quality, and 1·75 per cent. of small coke, or altogether 80·92 per cent.

The coal societies of Val-Benoit and Grand-Bac, after having made various trials with its coals, gave the preference to the Dulait ovens, and constructed at Tilleur, in 1865, a group of 30 ovens, the results of which encouraged them to build a second and similar group. The mean duty was 78 per cent. of excellent coke. The charge of coal for the 24 hours' coking was from 2·3 to 2.4 tons, according to the quality. Some of the Dulait ovens hold a charge of 3·6 tons, with a coking time of from 36 to 44 hours, and they have also been constructed for 4·2 tons to coke in 48 hours. The preceding remarks have especial reference to per centage of introduction. Another critic confines himself to the high cost of construction.

The actual cost of materials and labor in a Dulait furnace, with mechanical discharging, and for a production of 2·4 tons in 24 hours, is 2700f., without foundations or ground. On the other hand, it is asserted that these ovens can go for ten years with only trifling repairs, while the Smet ovens require at the end of five years repairs equal to half the first cost of construction. If to this advantage of the Dulait system we add that of its preserving the heat better, of treating a larger charge and giving a better yield of coke, notwithstanding the results obtained at certain works, we shall see that this system is preferable to the other, especially for inferior coal. M. DULAIT has constructed in the different coal basins of Belgium 1,100 ovens, and about 700 abroad, in France, Prussia, and Austria.

TO BE CONTINUED.

The London School of Mines.

THE Lords of the Committee of Council on Education having transferred the instruction in Physics, Chemistry, Applied Mechanics, and Natural History, from the Royal School of Mines, in Jermyn street, and the College of Chemistry, in Oxford street, to the New Buildings, in Exhibition Road, South Kensington, the following courses of lectures, demonstrations, and practical laboratory instruction are now given at South Kensington, at the dates specified:

Chemistry, by Professor FRANKLAND, D. C. L., F. R. S. A course of forty lectures on Inorganic Chemistry, commencing October 6, 1873. A course of thirty lectures on Organic Chemistry, commencing January 19, 1874. Laboratory instruction, consisting of an elementary and an advanced course, commencing on October 1. Fees—Lectures on Inorganic Chemistry, £4; Lectures on Organic Chemistry, £3; together, £6. Laboratory instruction, £12 for three months, £9 for two months, and £5 for one month.

Biology, by Professor HUXLEY, LL D., F. R. S. A course of eighty lectures on Biology, (or Natural History, including Palæontology,) with Laboratory instruction, commencing October 6, 1873. Fee for the full course, £10; for the lectures only, £4; for the Laboratory instruction, £6.

Physics, by Professor FREDERICK GUTHRIE. The course will consist of about sixty lectures, with laboratory work on the subject of the lectures. The course will commence on February 16, 1874. Fee for lectures alone, £4; fee for lectures and laboratory work, £10.

Applied Mechanics, by Professor GOODEVE, M. A. The course will consist of thirty-six lectures, with demonstrations, commencing on February 16, 1874. Fee for the course, £4.

Besides the students entering for the Associateship of the Royal School of Mines, and Teachers in Training, only such a limited number of occasional public students will be admitted as can be accommodated. Letters with respect to the foregoing courses should be addressed to the Secretary, Science and Art Department, South Kensington, London, S. W.

The instruction in Chemical Science embraces:

(1), A course of lectures on Experimental Chemistry, with special reference to the applications of Chemistry in the Arts and Manufactures.

(2). A systematic laboratory course, for the Practice of Chemical Analysis.

(3). An advanced laboratory course for technical applications of Chemical Analysis and for Chemical Research.

Chemical Laboratories—The laboratories for instruction in chemical manipulation in qualitative and quantitative analysis, the technical application of analysis, and in the method of performing chemical researches, are under the direction of Dr. FRANKLAND, and will be opened on Wednesday, October 1, 1873. The laboratories at South Kensington Museum are now used for the instruction of the pupils of the Royal School of Mines.

There are three terms in the collegiate year, of three months each, commencing in the first week of October, January and April respectively. The laboratory hours are from 10 A. M. to 5 P. M., with the exception of Saturday, when the laboratory closes at 2 o'clock.

Each laboratory student works independently, there being no classes. All operations are superintended by the Professor and his assistants. A table with drawers, cupboards and shelves is appropriated to every pupil. The institution supplies gas, fuel and reagents. The larger and more expensive instruments of the laboratory, such as air pumps, thermometers, barometers, condensers, &c., may be used by the students, who are responsible for their safety. The students have to provide themselves only with the apparatus specified in the laboratory regulations. More advanced students engaged in private researches have to supply themselves with such materials as are not included amongst the ordinary reagents of the laboratory.

The charge for instruction in the Chemical Laboratory is £12 for three months, £9 for two months, and £5 for one month. This charge does not include the fees for attending the Lectures.

Professor of Metallurgy.—DR. PERCY, F.R.S.

The course of instruction in Metallurgy consists of Lectures and Laboratory Practice, especially in Assaying.

The object of the Lectures is the communication of such instruction as the student may be able to apply to the greatest practical advantage when he may be subsequently engaged in conducting any metallurgical process.

Metallurgical Laboratory.—This Laboratory is conducted by Mr. R. SMITH, under the direction of Dr. PERCY, and is devoted to practical instruction in Metallurgy, especially in Assaying. The nature of this instruction will be adapted to the special requirements of the student. It comprises assaying in all its branches, especially of the more important metals, such as iron, copper, lead, tin, alloys of silver and gold, &c.; and the examination of ores and metallurgical products.

The ability of the student to make trustworthy assays is in every case thoroughly tested, and no certificate of competency is given to a student who has not furnished satisfactory proof that he is able to obtain accurate results.

There are three terms in the collegiate year, of three months each. The Laboratory hours are from 10 to 4 during November, December, January, February; and from 10 to 5 during the other months, with the exception of Saturdays, when the Laboratory is closed.

The charge for instruction in the Metallurgical Laboratory is £15 for three months, £12 for two months, and £7 for one month.

Lectures to Working Men.—Short Courses of Lectures at suitable periods of the year are given in the evening to Working Men. These courses are systematic, and arranged so as to illustrate, within a period of two years, the principal subjects taught at the Institution. Those for the ensuing Session include Natura History, Geology, and Mineralogy.

Engineering and Mechanical Notes.

Messrs. MONTEFIORE LEVI exhibited at Liege a heavy bevel pinion, of phosphor bronze, which has been in constant use in driving a universal rolling mill for the last nine months; the teeth were very much worn, but notwithstanding this, the pinion was returned to its place at the end of the meeting, as it is by no means yet considered past service.

Engineering describes a patent 3-high plate mill, with movable center roll, patented by Messrs. GILLON & DUJARDIN. It is driven by a very compact double-cylinder water engine, working under a column of water of 150 feet; the cylinders have a stroke of .78 inches, and are 1.83 inches in diameter. This machine is capable of working up to ¾ horse power, and the price is 700 francs, or 28*l*. It was exhibited by M. JASPER, of Liege.

Since the commencement of 1872 the wages of various trades have risen at Berlin, Prussia, as follows: Well sinkers, 21 per cent.; tilers, 15; iron founders, 50; glaziers, 35; tinmen, 25; painters, 40; locksmiths, 45; masons, 25; paperhangers, 25; joiners, 50; carpenters, 28; bricklayers, who, by-the-bye, have been the most exacting of all, far beyond 50 per cent.

THE PEAT FURNACE AT ISHPEMING.—This furnace, according to the Marquette *Mining Journal*, has been so remodeled as to be now prepared for charcoal or peat, or for the mixture. We judge, from the large quantity of charcoal on hand and being made—as well as peat—that the two are to be used in combination. In any event, it is quite certain the late additions made to the furnace, in the way of a large and well planned hot blast, a higher tunnel head, enlarged gas flues, etc., will make this furnace a practical working machine, instead of a chemist's plaything.

British Iron Exports.

FROM the Board of Trade returns for August, we learn that the exports from Great Britain in that month for three years has been

	1871.	1872.	1973.
Pig and puddled iron	109,650 tons	118,839 tons	78,755 tons
Bar, angle, bolt and rod ..	32,335 "	28,890 "	22,135 "
Railway	98,369 "	94.982 "	73,906 "
Wire.....	1,894 "	3,086 "	2,235 "
Hoop, sheet and boiler ..	19,864 "	18 347 "	13,767 "
Tin plates	10,369 "	12.429 "	8,176 "
Old Sun.....	19,247	6,789	3,120
Castings	22,966 "	22,608 "	25,479 "
Steel unwrought	3,681 "	4,115 "	3,077 "
Manufactured steel	1,365 "	1,020 "	970 "
Total.....	319,741	311,105	231,620

The falling off for August was therefore 25 per cent. from last year.

THE COAL TRADE.

NEW YORK, Oct. 3, 1873.

The coal dealers have shown generally an exemption from the effects of the financial panic which is remarkable. Several dealers say that they have not had a note protested, and that the requests for time have not been greater than in the usual course of business. Coal is steadily taken and there is even some stiffening of prices reported. When it is remembered that the sudden tightening of the market occurred just at the time when coal dealers are expected to take up their monthly quotas, it is evident that the trade generally is in excellent condition.

The only inconvenience the coal companies are likely to feel, is a possible difficulty in obtaining legal tender enough to pay off their men. This, however, though sometimes a troublesome question, rarely becomes a very serious one with old and well known companies. They can in case of necessity, manufacture their own money, in the shape of drafts, which perfectly satisfy the shopkeepers. The Delaware and Hudson Company, which pays the first of the month, will probably succeed in getting what money they want, though with some trouble. The Pennsylvania Company, which pays on the 15th, expect to find money abundant by that time.

The business in bituminous coal is more likely to suffer from the disaster to railway values and the stop put to the rapid extension in certain lines of manufacture. Quite a number of works are reported to have discharged a part of their men or to be running on half time. With manufacturers of railroad supplies the change is likely to be more or less lasting, but in other lines it is thought that the movement is either dictated by a temporary difficulty of obtaining legal tender or that this is thought to be a good time for economies that have been long in contemplation. Whatever the cause may be, it is not yet possible to say whether there will be stoppages enough to effect the demand for coal seriously.

The canal is open and coal is coming through, though not with the rapidity that was expected. Prices are quoted at $7.50 f. o. b. in New York. Franklin gas coal $7.25 in Baltimore.

Anthracite Coal Trade for 1872 and 1873.

The following table exhibits the quantity of Anthracite Coal passing over the following routes of transportation for the week ending, 1873, Sept. 27, compared with the week ending Sept. 28, 1872.

COMPANIES.	1872. WEEK.	1872. TOTAL.	1873. WEEK.	1873. TOTAL.
Phila & Reading R.R†	94,574	3,502,551	94,404	3,890,965
Schuylkill Canal	24,128	624,008	24,964	548,023
Lehigh Valley R. R.	61,916	2,496,467	72,871	2,648,387
Lehigh & Sus. R. R.	35,355	1,257,016	46,298	1,490,785
" " Canal	25,076	574,920	28,570	549,333
Scranton North	19,881	554,425	27,382	713,786
" South	37,129	1,586,163	37,953	1,574,601
Penn. Coal Co., rail	28,244	886,503	27,899	926,305
" " canal		4,557	625	6,561
Del. Hud C. Co. Canal	42,843	1,080,013	44,571	1,090,123
" " East	8,792	418,932	9,906	312,792
" " West	11,541	295,233	16,841	410,551
" " South	10,555	289,591	4,453	150,029
Shamokin	11,958	468,378	14,829	473,098
Trevorton	...	....	....	....
Lykens Valley Coal Co.	....	....	....	....
Wyoming North	....	....	....	....
Wyoming South	....	....	....	....
P. N. Y. C. & R. R. Co.	11,262	475,524	17,522	579,941
Williamstown Col'y	....	.....	....	....
Big Lick Col	....	.....	....	....
Total	423,271	14,451,271	469,098	15,380,186
1872			423,271	14,454,271
Increase			45,817	925,915
Decrease				

These figures are for the week and fiscal period commencing Nov. 30.

† Less coal transported for Company's use and Bituminous coal.

Bituminous Coal Trade, 1872 and 1873.

The following table exhibits the quantity of Bituminous Coal passing over the following routes of Transportation for the week ending Sept. 27, 1873, compared with week ending Sept. 28, 1872.

COMPANIES.	1872. Week.	1872. Year.	1873. Week.	1873. Year.
C. & O. Canal	17,257	485,319	22,032	465,024
B. & O. R. R.	24,800	925,860	32,373	1,089,889
Penn. S. Line	....	.....	4,277	73,499
H. & B. T. R. R.	4,991	217,841	11,715	331,333
*Harrisburg & D.	9,517	362,806	4,572	250,105
*L. V. R. R.	292	22,074	204	23,101
P. & N.Y.C. & R. Co.	6,487	283,571	6,059	288,910
{Cumberl'd Branch Canal.	5,037	164,676	5,314	96,351
{ " " Railroad	920	14,186	703	68,179
Total	69,301	2,476,333	87,249	2,636,591
	....		69,301	2,476,333
Decrease	....		....	
Increase	....		17,948	160,258

Pennsylvania Coal Company.

Shipments of Pittston Coal for the week ending Sept. 27, 1873.

	1873. WEEK.	1873. YEAR.	1872. WEEK.	1872. YEAR.
By Railway	27,898 02	926,3.5 03	28,244 10	886,502 15
" Canal	625 02	6,580 13		4,557 06
	28,523 04	932,865 16	28,244 10	891,060 01
Increase, 1873	41 805 15			

Philadelphia & Reading Railroad and Branches.

COAL TONNAGE

For the Week ending Saturday, Sept. 27, 1873

BY RAILROAD.—ANTHRACITE.

PASSING OVER MAIN LINE AND LEB. VAL. BRANCH.

	Tons. Cwt.
From St. Clair	33,516 13
" Port Carbon	4,188 09
" Pottsville	3,596 18
" Schuylkill Haven	29,284 05
" Pine Grove	6,695 04
" Tamaqua	11,847 18
" Harrisburg	10 00
" Dauphin	5,294 08
Total	94,404 05

FOR SHIPMENT BY CANAL.

Passing Frackville Scales	8,359 05
" Mill Creek "	2,071 05
" Schuylkill Valley Scales	562 09
" Mt. Carbon "	1,556 13
" Cressona "	8,598 03
" Pine Grove "	....
" Tamaqua "	3,295 16
Total	24,463 11

SHIPPED WESTWARD VIA CATAWISSA AND WILLIAMSPORT BRANCH AND NORTHERN CENTRAL RAILROAD.

Via Catawissa & Williamsport Br.	475 13
" N. C. R. R. passing Locust Gap	1,071 09
" " " Shamokin	4,693 03
" " " Herndon	....
Total	6,220 05

SHIPPED WEST OR SOUTH FROM PINE GROVE.

Via Schuylkill & Susquehanna R. R.	1,642 06
" Lebanon & Pine Grove Branch	1,064 11
Total	2,706 17

CONSUMED ON LATERALS.

From Frackville Scales	622 09
" Mill Creek "	247 17
" Schuylkill Valley Scales	703 17
" Mt. Carbon "	1,260 10
" Cressona "	626 10
" Pine Grove "	80 16
" Tamaqua "	449 06
Total	3,990 18

LEHIGH AND WYOMING COAL.

Received via Silverbrook Junction, Sent East	10,883 03
Cat. & Wpt. Br. Sent West	....
" " Rupert, Cat. & Wpt. Br.	26 08
" " Allentown E. Penn'a Br.	269 10
" " Alburtis, " "	4 08
" " Oreland, G. & N. Br.	2,055 12
" " Willow Street R. R.	725 00
Total	13,954 11

BITUMINOUS.

From Harrisburg	4,562 08
" Connecting R. R., G. & N. Br.	....
" Junction R. R.	10 00
Total	4,572 08

COAL FOR COMPANY'S USE.

Anthracite	7,205 05
Bituminous	129 08
Total	7 334 13

RECAPITULATION.

	Total for Week.	Corresp'g week last year.	Increase and Decrease.
Passing over Main Line and Leb. Val. Branch	94,404 05	94,573 18	d 169 13
For Shipment by Canal	24,463 11	28,293 09	d 3,829 18
Shipped Westward via Northern Central R. R.	6,220 05	6,200 00	i 20 05
Shipped West or South from Pine Grove	2,706 17	1,791 07	i 915 10
Consumed on Laterals	3,990 18	5,834 08	d 1,843 10
Lehigh and Wyoming Coal	13,954 11	2,089 11	i 11,865 00
Total Anthracite paying freig't	145,740 07	138,782 13	i 6,957 14
Bituminous	4,572 08	9,517 06	d 4,944 18
Total of all kinds paying freig't	150,312 15	148,299 19	i 2,012 16
Coal for Company's use	7,334 13	5,162 00	i 2,172 13
Total Tonnage for Week	157,647 08	153,461 19	i 4,185 09
Previously this year	5023561 11	4725952 01	i 297,609 10
Total to date	5181228 19	4879414 00	i 301,814 19

SHIPPED BY CANAL.

From Schuylkill Haven	21,338 13	27,573 00	d 6,234 07
" Port Clinton	3,625 00	1,741 00	i 1,884 00
Total Tonnage per Week	24,963 13	29,314 00	d 4,350 07
Previously this year	538,059 09	603,344 05	d 65,284 16
Total to date	563,023 02	632,658 05	d 69,635 03

Statement of Coal Transported over Cumberland and Pennsylvania Railroad

During the week ending Saturday Sept. 27, and during the year 1873, compared with the corresponding period of 1872.

WEEK.

	C. & O. C'l Tons. Cwt.	B. & O. R. R. Tons. Cwt.	Pa. S. Line Tons. Cwt.	Total. Tons. Cwt.
1873	22,032 06	32,373 10	4,273 16	58,679 14
1872	17,256 15	24,799 17	....	42,056 12
Increase	4,775 13	7,573 13	4,273 16	16,623 02
Decrease	....	....	....	....

YEAR.

1873	465,024 08	1089889 15	73,498 12	1,628,411 15
1872	485,318 14	925859 19	....	1,411,178 13
Increase	....	164,029 16	73,498 12	217,233 02
Decrease	20,294 06	....	....	....

Cumberland Branch R. R.

WEEK.

	To C. & O. Canal. Tons. Cwt.	To P. & O. R. R. Co Tons. Cwt.	Total. Tons. Cwt.
1873	5,313 16	702 15	6,016 11
1872	5,036 17	919 15	5,956 12
Increase	276 19	....	59 19
Decrease	....	217 00	.....

YEAR.

1873	96,351 04	68,178 15	164,529 19
1872	164,675 14	14,196 91	178,861 15
Increase	....	53,992 14	....
Decrease	68,324 10	....	14,331 16

Report of Coal Transported over Central R.R. of N. J. (Lehigh and Susq. Div.)

Week ending Sept. 27—Compared with same time last year

REGION SHIPPED FROM.	TIDE. tons ct.	LOCAL. tons ct.	CANAL. tons ct.	TL. WEEK tons cwt.	TL. DATE tons.cwt.
Wyoming	26888 11	6250 01	3345 19	36484 11	1314396 10
Upper Lehigh		3706 04	710 04	4216 08	149857 00
Beaver Meadow	3846 19	2758 17	2674 11	9280 08	2:6304 16
Hazleton		776 10	7046 19	7823 09	15 920 18
Mauch Chunk	2860 07	3717 14	8480 12	15058 13	421593 00
Total	3359 16	17009 06	22258 05	72863 07	2269852 03
Prev'ly reported	1019359 06	703348 05	444091 05	2193:88 16	
Total to date	1022955 0	720357 11	466938 10	2269852 03	
Same time .1872	884282 14	539364 03	373902 16	1808949 13	
Increase	198672 08	81193 08	94736 14	373902 10	
Decrease					

DISTRIBUTION.	WEEK 1873.	WEEK 1872.	YEAR 1873	YEAR 1872.
Forwarded East by Rail to Tidal points	33595 16	24568 11	1082955 02	884282 14
Forwarded East by Rail to Local points	10429 10	8916 08	332969 16	276858 19
Forwarded East by Rail use Central Division	1795 00	1000 14	65995 17	57990 10
Forwarded East by Rail use L. & S.	477 02	279 00	8864 04	6583 15
Delivered at and above Mauch Chunk	2380 19	1712 01	58701 14	42363 10
Delivered at Coalport & Hazard for Canal	22258 05	16807 09	500426 13	414154 14
Delivered to L. V. R. R. at Packerton	409 10	463 04	18615 03	10899 00
Delivered to L. V. R. Rd at Sugar Notch	1517 05		69898 08	
Delivered to L. & B. R. R. at Plymouth Bridge		5935 11	131425 00	171806 11
Total	72,863 07	60292 18	2269852 03	1808949 13

Penn. and N. Y. R. R.—Coxton, Pa.

Coal tonnage for week ending Sept. 27, 1873.

	Week. Tons. Cwt.	Total. Tons. Cwt.
Anthracite received:		
From Lehigh Valley R. R.	13,046 11	391,888 03
" Lack. & B. R. R.	2,050 08	33,280 02
" Pleasant Valley R. R.	1,717 15	126,458 11
" Sul. & Erie R. R.	707 10	28,313 18
Total	17,522 04	579,940 14
Same time last year	11,262 10	475,523 12
Increase	6,259 14	104,417 02
Decrease		
Distributed:		
To Lehigh Valley R. R.	91 15	24,004 13
To Lack. & B. R. R.	5,072 16	1,424 00
To S. Central R. R.	4,793 19	126,225 12
To Ithaca & A. R. R.		118,556 18
To Erie R. W. Pockets for shipm't.	5,262 10	212,346 16
To Erie Railway, Watkins direct.	299 07	9,788 05
To individuals on line of road	889 04	23,392 18
To points at & above Coxton for use of Co.	552 15	21,687 19
To points between Waverley and Elmira	559 18	40,503 18
Total	17,522 04	579,940 14
Bituminous received from BARCLAY R. R.		
Shipped north from Towanda	6,059 03	286,879 07
Shipped south from Towanda	12 00	1,795 15
Northern Central R. R.		234 09
Total	6,071 03	288,909 12
Same time last year	6,487 09	283,571 04
Increase		
Decrease	416 06	45,661 12
Distributed:		
To Erie Railway	5,764 09	213,797 04
To So. Central R. R.	194 17	20,542 03
To Ithaca Valley R. R.	94 09	470 15
Lehigh Valley, R. R.	....	940 19
To individuals on line of Railroad.	17 08	1,040 07
To points on line of road for use of Company	....	118 04
Total	6,071 03	238,909 12
Grand totals transported		
Anthracite	17,522 04	579,940 14
Bituminous	6,071 03	238,909 12
Total	23,593 09	818,850 06
Same time last year	17,749 19	759,094 16
Increase	5,843 08	59,755 10
Decrease	.....	

Delaware Lackawanna & Western Rail Road Company.

Coal transported on the Delaware, Lackawanna, & Western Railroad for the week ending Saturday, Sept. 27, 1873.

	WEEK. Tons. Cwt.	YEAR. Tons. Cwt.
Shipped North	27,382 00	718,786 03
Shipped South	37,932 17	1,574,603 17
Total	65,314 17	2,288,390 00
For the Corresponding time last Year:		
Shipped North	19,780 19	554,425 07
Shipped South	37,129 07	1,586,163 07
Total	57,010 06	2,140,588 14
Increase	8,304 11	147,801 06
Decrease		

Delaware and Hudson Canal Company.

Coal mined and forwarded by the Delaware and Hudson Canal Company for the week ending Saturday, Sept. 27, 1873.

	WEEK.	SEASON.
By Delaware and Hudson Canal	44,571	1,090,123
By Railroad, East	9,906	312,792
" West	16,841	410,551
" South	4,453	150,029
Total 1873	75,771	1,963,495
Corresponding time in 1872:		
By Delaware and Hudson Canal	42,840	1,080,003
By Railroad, East	8,792	418,932
" West	11,534	295,233
" South	10,555	289,591
Total	73,718	2,083,729
Decrease	120,264	

Report of Coal Transported over the Lehigh Canal

For the week ending Sept. 26, 1873.

REGIONS SHIPPED FROM.	TIDE. tons, ct.	LOCAL tons, ct.	TL. WEEK tons cwt.	TL. DATE tons, cwt.
Mauch Chunk Region	4,372 13	4,561 07	8,884 00	171,222 07
Mauch Chunk Region Hazardville	811 11	1,162 12	1,974 03	21,092 02
Beaver Meadow Region	1,188 14	3,911 14	5,099 08	90,521 00
Mahanoy Region		557 18	557 18	15,829 02
Hazleton Region	791 05	6,630 19	7,422 04	142,372 14
Upper Lehigh Region		878 00	878 00	21,252 06
Wyoming Region	2,110 17	1,356 00	3,466 17	73,891 00
Wyoming Region, Hazardville	291 01		291 01	4,225 15
Total,	9,511 01	19,058 10	28,569 11	549,336 06
Previously reported	189099 17	331666 18	520,766 15	
Total to date	198610 18	350725 08	549,336 06	
Corresponding week last year	221653 11	353268 06	574,919 17	
Increase				
Decrease	23,042 13	2,540 18	25,583 11	

DISTRIBUTION.	WEEK 1873.	WEEK 1872.	YEAR. 1873.	YEAR. 1872.
Consumed on line of Lehigh Canal	2,799 17	2,292 01	56,624 16	55,762 11
Passed into Morris Canal to Tidal Points	70 00	192 00	2,138 09	4,615 08
Passed into Morris Canal to Local Points	1,422 12	684 19	23,397 12	18,316 13
Passed into Del. & Rar. Canal to Tidal Points	9,441 01	10,502 00	196,577 09	217,038 08
Passed into Del & Rar. Canal to Local Points	462 19	569 12	9,821 01	11,722 19
Consumed on line Delaware Div. Canal	1,228 13	1,071 15	32,873 09	36,218 03
Passed through to Bristol	13,143 09	9,774 18	227,908 10	232,346 00
	28,569 11	25,077 05	549,336 06	574,919 17

Report of Coal Transported over Lehigh Valley Railroad

Report of coal tonnage for the week ending Sept. 27, 1873, with Totals to date, compared with same time last year.

WHERE SHIPPED FROM.	WEEK. Tons. Cwt.	TOTAL Tons. Cwt.
Total Wyoming	17,314 09	703,010 03
" Hazleton	51,996 12	1,779,393 12
" Upper Lehigh		2,363 07
" Beaver Meadow	15,322 00	536,431 19
" Mahanoy	15,417 19	412,731 05
" Mauch Chunk	237 13	3,662 06
Total	100,288 13	3,436,992 12
Same time last year	81,130 16	3,173,093 09
Increase	19,157 17	263,899 03
Decrease		
Forwarded East from Mauch Chunk by rail	72,871 00	2,648,396 18
Same time last year	61,945 13	2,496,466 16
Increase	10,925 07	151,920 02
Decrease		

DISTRIBUTED AS FOLLOWS.

Local East of Mauch Chunk	2,025 10	68,923 13
Forwarded East for use L. V. R.	1,064 07	43,101 07
Delivered to Furnaces and Manufacturing Companies	14,003 05	567,171 18
Delivered to Cat. & Fog. R. R.	200 13	5,385 13
" " East Penn R. R.	215 10	7,749 02
" " North Pennsylvania Railroad	6,796 02	262,179 15
" " Port Del	6,314 09	164,225 06
" " East Amboy Railroad		
" " Morris and Essex Railroad	5,571 07	227,202 13
" " Bel. Del. Railroad	27,065 09	859,289 03
" " Central Railroad	9,524 08	443,159 08
Delivered at and above Mauch Chunk for use of L. V. R. R.	1,426 14	55,553 14
To P. & N. Y. R. R.	13,046 11	391,886 03
To Northern Central R. R.	703 08	16,747 15
To D. H. & W. R. R.	771 18	27,445 13
To L. & S. R. R. at Packerton for rail	451 07	11,348 16
To Individuals at Mauch Chunk	21 17	2,037 13
To Individuals above Mauch Chunk	286 19	11,966 15
To L. & S. R. R., at Penn Hav., for railroad Do. for canal	7,046 19	1 541 10 141,753 06
To Lehigh Canal Mauch Chunk	3,653 00	58,579 15
To Catawissa Railroad		50 00
To L. & B. R.R. at Lack. Junc.		69,692 14
Total	100,288 13	3,436,992 12

Delaware and Hudson Canal Company.

Coal mined and forwarded by the Delaware and Hudson Canal Company for the week ending Saturday, Sept. 27, 1873.

	WEEK.	SEASON
North	59,517 13	1,997,605 02
South	4,453 03	150,028 16
Total 1873	63,970 16	2,147,633 18
Corresponding time in 1872 :		
North	51,650 18	1,917,901 02
South	10,554 16	289,590 16
Total, 1872	62,205 14	2,207,491 18
Increase North	7,866 15	79,704 00
Decrease North		
Increase South		
Decrease South	6,101 13	139,562 00
Increase	1,765 02	
Decrease		59,858 00

Northern Central Railway, Shamokin Division.

Below is the return of Coal sent over the Shamokin Division of the N. C. R. W., for the 7 days ending Sept. 26, 1873.

	Tons.	Cwt.
East	2,329 10	
West	12,529 01	
		14,858 11
Same time last year		11,957 12
Increase		2,900 19
Decrease		
Total amount shipped to date		473,098 07
Same time last year		408,377 17
Increase		64,720 10
Decrease		

Prices of Coal by the Cargo.

[CORRECTED WEEKLY.]

Company Coals.

Oct. 1873.

	L.	Str.	Gra.	Eg.	Sto.	Chest
Pittston at Newburgh	5 10	5 00	5 10	5 20	5 50	5 00
*Lackawana at Rondout	5 25	5 25	5 45	5 50	5 80	5 20
Wilk'b're at Pt. John'n	5 00	5 15	5 25	5 40	5 60	5 05
Old Co. Lehigh at Pt. John'n	6 10	5 85	5 85	5 95	5 20	—
New York Coal Exchange	6 00	5 85	5 85	5 95	5 20	—
AT PHILADELPHIA.						
Hard White Ash	4 60	4 60	4 70	4 70	4 90	3 95
Free B'rn'g White Ash Coal	4 60	4 60	4 70	4 70	4 90	3 95
Schuylkill Red Ash	—	—	4 70	4 85	5 05	3 95
Alaska Red Ash	—	—	4 70	4 70	4 90	3 95
Shamokin White Ash	—	—	4 80	5 00	5 10	4 10
North Franklin	—	—	5 10	5 10	5 00	4 00
Lorberry	—	—	5 35	5 35	5 35	4 35
Lykens Valley	—	—	—	6 10	6 10	4 75
SHIPPED FROM ELISABETHPORT, HOBOKEN AND TRENTON.						
L. C. and N. Co., Newport	—	—	5 35	5 50	5 70	5 10
" " Plymouth Red Ash	—	—	5 15	5 60	5 80	5 10
" " Room Run	5 85	—	5 70	5 70	5 95	5 15
Honeybrook Lehigh	5 90	—	5 80	5 85	5 90	5 20
Fulton, "	6 00	—	5 85	5 85	5 95	5 20
Scranton	4 85	5 10	5 20	5 55	5 65	5 20

For freights to different points see "Freights."
*To contractors only.

Prices at Baltimore—Oct. 1873.

Wholesale Prices to Trade.

Wilkesbarre, by cargo or car load	$6 00@6 25
Pittston and Plymouth, do	5 75@6 00
Shamokin Red or White Ash, do	6 00@6 25
*Lykens Valley Red Ash, do	@6 55
By retail, all kinds per ton of 2,240 lbs	7 50@8 50
*George's Creek and Cumberland f. o. b. at Locust Point for cargoes	4 85@5 00
West Va. and Youghigheny gas f. o. b. at L. Point	6 50
Kanawha Cannel, coarse	@12 50

* Freight to New York $2 15.

BITUMINOUS COALS.

Kittaning Coal Co.'s Phœnix Vein, f. o. b. at Phila	$
Lemon " " "	
Cumberland Vein Coal	
Tyrconnel f. o. b.	$7 00

Prices at Georgetown, D.C., and Alexandria, Va.

Oct. 1873.

George's Creek and Cumberland f. o. b. for shipping $4 60@4 75

Prices at Havre de Grace, Md.

Oct. 1873.

Wilkesbarre and other White Ash for Cargoes	$5 50@6 00
Lykens Valley	6 25@6 50
Shamokin Red or White Ash	5 75@6 00

Bituminous Coals (Cumberland).

Georgetown, f. o. b.	$4 60
Baltimore	5 00
New York	7 50
South Amboy	6 50

Prices of Foreign Coals.

Oct. 1873.

Duty 75 c. per ton.

Corrected weekly by ALFRED PARMELE, No. 32 Pine street, N. Y.

Liverpool Gas Caking	— @ —
" " Cannel	17 00@— —
" House "	20 00@22 00
" Orrel	20 00@— —

Per ton 2,240 lbs., ex-ship.

PRICES FROM YARD.

Liverpool House Orrel, screened	$20 00@22 00
"Cannel, "	22 00@25 00

Per ton 2,000 lbs. delivered.

Prices of Gas Coals.

Oct. 1873.

PROVINCIAL.

Corrected weekly by Louis J. Belloni, Jr., 41-43 Pine st., N. Y

	Coarse	Slack
Block House, f. o. b. at Cow Bay	$2 50	$1 25
Gowrie	2 00	0 00

Corrected by Bird, Perkins & Job, 27 South street.

	Coarse.	Culm of Coal.
Pictou net	$3 00	1 50
Sydney	3 25	1 00
Lingan	2 75	1 00
Caledonia	2 75	1 25

A discount from the prices of the coarse Coal on purchase of 5000 tons and upwards. Duty on all slack coal or Culm : 40c. per ton of 28 bushels, 80 pounds to the bushel. On all bituminous coal or shale: 75 cents per ton of 28 bushels.

AMERICAN.	Nominal quo Currency.
Westmoreland f. o. b.	$6 00 @7 00
Fairmount Gas Coal Co. of N. Y. "	6 50 @7 00
Despard Coal Co. "	6 50 @7 00
Penn. "	6 50 @7 00
Newburg Orrel Gas. "	6 50 @7 00
West Fairmount Gas Coal "	6 50 @7 00
Redbank Cannel, at Pa. "	12 00 @0 00
AT PHILADELPHIA.	
Westmoreland "	7 50 @0 00

Foreign and Provincial Freight.

Oct, 1873.

Foreign.

Newcastle and Ports on Tyne, per keel of 21 1-5 tons £
Liverpool, 5 per cent primage

TO NEW YORK.

Provincial

Sydney	$5 00
Lingan	4 00
Cow Bay	4 00
Port Caledonia	4 00
Little Glace Bay	4 00

TO BOSTON.

Sydney	3 50
Lingan	3 50
Cow Bay	3 50
Port Caledonia	3 50
Little Glace Bay	3 50

TO MONTREAL.

Caledonia	3 75 gold

TO CUBA.

Caledonia	2 50 gold.

Freights.—Oct. 1873

TO EASTERN PORTS.	Cumberland. From Georgetown.	Cumberland. From Baltimore	Anthracite. From Philadel'a.	Anthracite. From Elizabethport, Port Johnston, Weehawken, and Hoboken.	Anthracite. From Newburgh.	Anthracite. From Rondout...
Amesbury	—	—		—	—	—
Bangor	—	3 50		2 00	2 10	2 15
Bath	—	3 00		—	—	—
Boston	3 00	3 25		2 00*	2 10	2 15
Bridgeport	2 50	2 65		1 00	1 10	1 15
Bristol	—	—		1 40	1 50	1 50
Cohasset Narrows	3 00	—		—	—	—
Derby	—	—		1 25†	1 35	1 40
Dighton	2 60	—		—	—	—
East Cambridge	—	—		2 00	2 10	2 15
Fall River	2 50	2 70		1 35	1 45	1 50
Hackensack	—	—		—	—	—
Hartford	3 25	3 25		1 50	1 60	1 65
Hoboken	2 15	—		50	—	65
Jersey City	2 15	—		50	—	60
Lynn	—	—		—	—	—
Middletown	—	—		1 25	—	1 40
Mystic	—	—		1 25	—	1 40
New Bedford	—	2 85		1 45	—	1 55
Newburyport	—	3 25		2 15	—	2 30
New Haven	2 50	2 65		1 00	1 10	1 15
New London	2 50	2 75		1 20	1 30	1 35
Newport	—	—		1 30	—	1 50
New York	2 30	2 15		50	—	65
Norwalk	—	2 75		1 00	—	1 15
Norwich	2 65	3 00		1 30	1 40	1 45
Pawtucket	—	2 90		1 45‡	—	1 60
Portland	3 00	3 00		1 90	—	2 05
Portsmouth, N. H	3 25	3 25		2 10	—	2 25
Providence	2 50	2 70		1 35	1 45	1 50
Rockport	—	—		—	—	—
Saco	—	—		—	—	—
Sag Harbor	—	—		1 20	—	1 35
Salem	3 00	3 25		2 00	—	2 15
Stamford	—	—		1 00	1 10	1 15
Stonington	—	—		1 25	—	1 40
Taunton	—	—		1 85	—	2 00
Warren	—	—		1 35	—	1 50
TO RIVER PORTS						
Albany		2 50				55
Catskill						50
Cockaackie						65
Coeyman's						60
Cold Spring						30
Fishkill						45
Haverstraw						35
Hudson		3 60				60
New York vessels						45
Nyack						35
Poughkeepsie	2 40					30
Rhinebeck						—
Rondout						40
Saugerties						50
Sing Sing						55
Stuyvesant						50
Tarrytown						60
Troy						20
West Point						50
Yonkers						

† 3 c. per bridge per ton in addition to freight.
† New Haven rate and towing 25 c. extra per ton.
‡ Towing from Providence and return, extra.
‖ And Towing.

St. Thomas	$— — Gold
Martinique	— — "
Demerara	— — "
New Orleans	— —
Mobile	— — "

Rates of Transportation to Tide Water.

BY RAILROAD.

TO PORT RICHMOND, PHILADELPHIA.

Philadelphia and Reading Railroad, from Schuylkill Haven Lump and St., net, $1 60; Br., Egg and Ch., $1 65; Stove, $1 75. Shipping at Pt. R., 20c., for use at Phil., $2 18 from Pt. Carbon.

MAUCH CHUNK TO ELIZABETHPORT.

L. V. Railroad from Mauch Chunk to Phillipsburgh	$0 72
C. R. R., N. J., Phillipsburgh to Elizabethport	08
Shipping expenses at Elizabethport	25
Wharfage	10
Total	$2 23

MAUCH CHUNK TO PORT JOHNSTON.

L. V. R. R., or L. & S. R. R. from M. C. to Phillipsb'g	$0 72
C. R. R., of N. J., Phillipsburgh to Pt. Johnson	1 08
Shipping expenses	25
Wharfage	10
Total	$2 23

TO HOBOKEN

L. V. R. R., Mauch Chunk to Phillipsburgh	72
Morris & Essex R. R. Phillipsburgh to Hoboken	6
Shipping expenses	25
Wharfage	08
Total	$2 23

TO SOUTH AMBOY.

L. V. R. R.	
R. & D. R. R.	31
Cam. & Am. R. R.	
Shipping Expenses	75
Total	$2 28

PENN HAVEN TO ELIZABETHPORT.

L. V. R. R. Penn Haven to Phillipsburgh	84
C. RR. of N. J. Phillipsburgh to Elizabethport	1 08
Shipping expenses	15
Wharfage	25
Total	$2 32

MARKET REVIEW.

NEW YORK, Oct. 2, 1873.

IRON.—We continue to report a very quiet market for all brands of Scotch Pig. Holders generally are firm, and are not disposed to make sacrifices except on strictly cash sales; we quote Coltness $51, Glengarnock $46@$47, Eglinton $45, and Gartsherrie $49@$50, but with a light business these prices are somewhat nominal, and would, no doubt, be shaded for considerable parcels; we note sales of 100 tons Coltness, and 100 do. Summerlee on private terms; and a few small lots Glengarnock,

about our quotations. For American Pig, we quote the market in buyers' favor. Consumers are nearly out of market, having in many cases, ceased work altogether, while others are running on short time. The general production, however, is still going on, and the stocks at various furnaces are gradually accumulating. Prices are nominal, and for prompt cash, some concession would doubtless be made from our quotations; the only sale is 200 tons No. 2 X at $35. For all descriptions of old and new Rails, and also for Scrap, we have nothing to report, prices being almost unquotable, holders not being willing to sacrifice, while there is no disposition on the part of purchasers to invest at anything like present figures. Refined Bar from store continues steady at our quotations.

☞ The latest returns of the British Board of Trade show how nearly a complete check has been put upon the exportation of Iron from Great Britain to the United States. Comparing the returns of the month of August, 1872, with the same month in 1873, the export of Pig Iron declined from 10,508 tons to 7,235; of Bar, Angle and Rod Iron, from 5,032 to 497 tons; of Railroad Iron, from 30,005 to 6,937 tons; of Hoop and Sheet Iron, from 3,805 to 462 tons; of unwrought Steel, from 2,066 to 1,342 tons; and Cast Iron shows and increase from 1,055 to 2,282 tons. Uniting all the classes of Iron and Steel, the exports were 61,971 tons in August, 1872, and only 18,737 tons, or less than one-third as much, in August, 1873.

COPPER—The demand for Manufactured is very light, and some of the manufacturers are working short time or suspended entirely for the present; the old quotations are still current, however, say New Sheathing 38 cents, and Bolts and Braziers 40; Bronze and Yellow Metal Sheathing 27, and Y. M. Bolts 32, net cash. The market for Ingot is at a stand—25@25½ cents is the asking price for cash lots Lake, and 27 for November and December delivery; the only transactions we hear of is twenty tons Lake for export at a private price.

LEAD—Pig has become very quiet, and we hear of no sales. Foreign may be quoted seven cents for Ordinary, and Domestic 6¼@6¾, gold. Bar 9¼ cents, Sheet and Pipe 10½, and Tin-lined Pipe 16½ all less 10 per cent. to the Trade.

REGULUS ANTIMONY—Is selling only in a retail way at our quotations, 13¾@13¾ gold.

SPELTER—Silesian is dull and nominal; prices abroad are firm and rather higher. Western is selling at 8½ cents currency.

STEEL—The market is without change in any respect—the supply of English is equal to the demand.

TIN—There is scarcely any inquiry for Pig, and prices are nominal; we have only to notice the sale of a small lot Refined English at 29¼ cents gold; for Straits 31@31¼ cents is asked, and Banca 34 gold. Plates are also very difficult to move; prices have been reduced about 25 cents per box gold, but the response is feeble; the sales are 250 bxs. Charcoal Tin at $10.25; and 250 do. Charcoal Terne, $9.75 gold.

Withdrawals from bond for consumption 26th, 27th and 29th September—

Tin from England.....bxs.475

ZINC—Mosselmann Sheet is steady and quiet at old prices. Manganese black oxide 3½ cents, do. gray 5½ cents.

METALS.

NEW YORK, Oct. 3, 1873.

IRON.—Duty: Bars, 1 to 1½ cents ℔ lb; Railroad, 70 cents ℔ ton; Boiler and Plate, 1½ cents ℔ lb; Sheet, Band, Hoop, and Scroll, 1¾ to 1¾ cents ℔ lb; Pig, $7 ℔ ton; Polished Sheet, 3 cts. ℔ lb; Galvanized 2½; Scrap Cast, $6; Scrap Wrought, $8 per ton. All less 10 per cent. No Bar Iron to pay a less duty than 35 per cent. ad val.

	Store Prices.
Pig, Scotch—Coltness ℔ ton	51 00@— —
Gartsherrie	49 00@50 00
Glengarnock	46 00@47 00
Eglinton	45 00@— —
Pig, American, No. 1	43 00@44 00
Pig, American, No. 2	32 00@36 00
Pig, American, Forge	30 00@32 00
Bar Refined, English and American	— —@— —
Bar Swedes, assorted sizes gold	— —@137 50
	Store Prices, Cash.
Bar, Swedes, 1¾ to 5 x ⅜ & ⅞ 2 sq. & 6 to 12 x ⅜ & ¾	175 00@— —
Bar, Refined, ¾ to 2 in. rd. & sq. 1 to 6 in. x ⅜ to 1 in.	82 50@85 00
Bar, Refined, 1¼ to 6 by ¼	87 50@— —
Bar, Refined, 2¼ to 2⅞ round 1 & 1¼ by ¼ & 5-16	90 00@— —
Large Rounds	92 50@107 50
Scroll	102 50@135 00
Ovals and half-round	110 50@130 00
Band	102 50@105 00
Horse Shoe	117 50@— —
Rods, ¼ to 3-16 inch	92 50@135 00
Hoop	120 00@160 00
Nailrod	— @ 9
Sheet, Russia, as to assortment (gold)	18 @ 18¼
Sheet, Singles, D. and T. Common	—5¾@— 7
Sheet, D. and T. Charcoal	—7 @— 8¼
Sheet, Galv'd, list 10 per cent. discount	— —@— —
Rails, English (gold) ℔ ton	64 00@ 67 00
Rails, American, at Works in Pennsylvania, currency	73 00@ 75 00

COPPER.—Duty: Pig, Bar, and Ingot, 5; old Copper 4 cents ℔ lb; Manufactured, 45 per cent. ad val.

	All Cash.
Copper, New Sheathing, ℔ lb	— @— 38
Copper Bolts	— @— 40
Copper Braziers, 16oz. and over	— @— 40
Copper Nails	— @— 45
Copper, Old Sheathing, &c. mixed lots	24 @— —
Copper, Old, for chemical purposes, 14@16 oz	— @— —
Copper, American Ingot, Cash	25 @— 25½
Copper English Pig	— @— —
Yellow Metal, New Sheathing & Bronze	— @— 27
Yellow Metal Bolts	— @— 32
Yellow Metal Nails, Sheathing and Slat'g	27 @— 30

LEAD.—Duty: Pig, $2 ℔ 100 lbs.; old Lead, 1½ cents ℔ lb. Pipe and Sheet, 2½ cents ℔ lb.

Spanish (gold)	— —@7 00
German, do.	— —@7 00
English do.	— —@7 00
Foreign, Refined	7 25 @7 37½
Domestic do.	6 62½@6 75
Bar.....(net)	9 25 @— —
Pipe.....(net)	— —@10 50
Sheet	— —@10 50

STEEL.—Duty: Bars and Ingots, valued at 7 cents ℔ lb or under 2¼ cents; over 7 cents and not above 11, 3 cents ℔ lb; over 11 cents, 3½ cents ℔ lb, and 10 ℔ cent ad val. Store prices.

English Cast (2d and 1st quality) ℔ lb	— 18½@— 23
English Spring (2d and 1st quality)	— 9½@— 10½
English Blister (2d and 1st quality)	— 14 @— 18½
English Machinery	— 14½@— —
English German (2d an 1st quality)	— 12½@— 14½
American Blister "Black Diamond"	— —@— 11½
American, Cast, Tool do.	— —@— 17
American, Spring, do.	— —@— 11
American Machinery do.	— 11½@— 12
American German, do	— 9 @— —

TIN.—Duty: Pig, Bars, and Blocks, 15 ℔ cent. ad val.; Plate and Sheets and Terne Plates, 25 ℔ cent.; Roofing 25. ad val.

	Gold ℔ lb.
Banca	34 @—
Straits	31 @31¼
English	28 @—

PLATES.

Fair to Good Brands.	Gold.	Currency
I. C. Charcoal, ℔ box	$10 25 @10 50	$11 75 @12 25
I. C. Coke	8 25 @ 8 75	9 50 @10 00
Coke Terne	7 25 @ 8 25	8 50 @ 9 50
Charcoal Terne	9 75 @10 00	11 25 @12 00

SPELTER—Duty: In Pigs, Bars & Plates, $1.50 p. 100 lb

Plates, Foreign.....(gold) p. 100 lb.	7 37½@—7 87½
Plates, Domestic p. lb.	8¼@—11

ZINC—Duty: Pig or Block, $1.50 per 100 lb.; Sheet 2½c. per lb

Sheet	per lb.—10 @10¼

San Francisco Stock Market.

BY TELEGRAPH.

NEW YORK, Oct. 2, 1873.

The following report from the San Francisco Stock Board is dated Sept. 30th. Excepting a slight advance in Crown Point, the list is lower; the report is as follows:

			Sep. 30.
Savage	—	—	39
Crown Point	—	—	89
Yellow Jacket	—	—	42
Kentuck, "New Issue"	—	—	9⅝
Cholar Potosi	—	—	36
Gould & Curry "New Issue"	—	—	10⅝
Belcher "New Issue"	—	—	65
Imperial	—	—	3⅝
Raymond & Ely	—	—	66⅝
Meadow Valley	—	—	15
Eureka C. V.	—	—	20
Ophir	—	—	—
Hale and Norcross	—	—	—

American Institute of Mining Engineers.

OFFICIAL BULLETIN.

Announcements to Members and Associates.

I. The ENGINEERING AND MINING JOURNAL, which is the Organ of the Institute, and contains its proceedings, transactions and notices of meetings, will be sent to each Member and Associate on the payment of his annual dues. Back numbers cannot, as a rule, be sent.

II. Dues are payable in advance at the annual (May) meeting. Remittances should be made, as far as possible, by P. O. Order, payable to the Secretary.

III. The first volume of Transactions of the Institute is in course of preparation and will be sent, as soon as issued, to all members not in arrears.

IV. The regular October meeting of the Institute will be held in Easton, Pa., on Tuesday, October 21st, beginning at 7 o'clock P. M. Authors of papers are requested to notify the Secretary in advance of the subject and length of their papers.

Members will rendezvous at the United States Hotel.

WM. FIRMSTONE,
J. C. KENT,
J. M. SILLIMAN,
Local Committee of Arrangements.

THOMAS M. DROWN, Secretary.
1123 Girard street, Philadelphia, Pa.

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THE ENGINEERING AND MINING JOURNAL.

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IT will be seen from our pages, this week, that the pretended sale of American iron in England was anything but a *bona fide* affair. A price was quoted, but the metal has not been delivered, nor is there, so far as outsiders can judge, any prospect of a delivery this year. We do not presume to question the object of those who have manœuvred the reports so well that even men in the trade, who had no belief whatever in the reality of the sale, could not positively deny that it had been made; but if that object was to mislead the trade as to the real condition of our relations with England, it failed completely. It has been so evident that there was no possibility of actual sales of our iron abroad, that the rade itself has paid no attention to the reports, and the daily press has had all the discussion to itself. To those persons who feel aggrieved because this journal sometimes refuses to believe the most positive statements of men "on the ground," when some remarkable process is carried out, or some wonderful mine opened, we will say, that among the stories which have grown out of the reported sale to the Messrs. CAINE, was one to the effect that 3,000 tons of Lake Superior iron had been shipped direct to England. We claim the privilege of exercising our professional judgment upon assertions like this, the peat question, and similar puffed up problems, without regard to the positiveness of the assertions made.

Rock Boring in America.

OUR readers will have noticed from the numerous papers republished in our columns from the proceedings of various societies within a few months, that the diamond drill is rapidly gaining that leading, and, for some kinds of work, exclusive place which was long ago prophecied for it. The history of this instrument is very suggestive. It is at once so ingenious and so sensible, that no American can witness its operation without feeling at once surprised and jealous that it was not invented in this country. We owe it, however, to a Frenchman, LESCHOT by name. Soon after his demonstrations of its value, the patent was brought to this country and great results were expected from its use, but these hopes were destined to be thwarted. There were some defects in the machinery for moving the drill, which required years of patient work before they were fully removed. But the real stumbling block in its way was that the profession was not fully ripe for its reception. Although recognized as a very practical way of piercing rock, the cost of a drill, necessarily many times that of a set of the old hand drills, seemed to prevent its adoption for a long time, until, in fact, it was perceived that a new system of mining was necessary, fitted to the requirements of the new tool. Like nitro-glycerine, and similar compounds—the other great improvement in mining made in late years—the drill needed to have the work to be done suited to its peculiar powers. Once this took place, the triumph of the drill was so plain that there was no longer hesitation in following up the first success in many quarters. It was found that work could be done as cheap, when all things were considered, as by the ordinary method, and much more comfortably. It took some time for the profession to come to a good understanding of the new tool, but when that finally took place, as it always does with meritorious inventions, the diamond drill began a brilliant day. During this time however, one hand and another had tried to introduce it, until at length it was committed to the care of a company especially formed to manufacture it, and if necessary to contract for work to be done with it. Since then it has had a hopeful history.

We have in former articles spoken of the drill as a prospecting tool. It is used in this way in mines of iron, lead, copper and silver. For our own part we do not see why the drill cannot perform the best service in those irregularly distributed deposits of ore which characterize the Utah mines, and all like them. Judiciously used, it could hardly fail to be an accurate and ready guide to the presence or continuance of deposits.

In submarine work its operation is as perfect as can be, and in shaft sinking—the last and most brilliant achievement of this instrument—it has accomplished wonders. Major BEAUMONT, whose paper on the Diamond Drill, read before the British Iron and Steel Institute, was published by us last week, was unable to hear of anything in the way of tunnel driving or shaft sinking, except some experimental trials. If he had studied rock-boring in this country, he would have found both of those feats far advanced beyond the experimental stage.

These drills are at work in the Columbia Hill tunnel, California just completed, the Bloomfield Mining Company's tunnel, California, the Sutro tunnel, Nevada, and drills are now making for the Sierra Madre Tunnel, which is to pierce the Rocky Mountains near Denver, Colorado. In foreign countries, on this side of the ocean, these machines are tunnelling in Peru, Chili, and Mauritius, and a set will soon be shipped to Mexico for the Tunnel of Minerale, Catavié. Their use as shaft sinking tools has received remarkable impetus from the brilliant success of the initial work of that kind, which has been so fully described by Mr. COXE in these columns. In addition to that work, shafts are now sinking under the operations of the Diamond Drill for the Westmoreland Coal Company in Pennsylvania, the Springfield Deep Run Coal Company, Virginia, and the Foster Coal Company, Ohio. Some improvements have lately been made in the mining drill, which have for their object a greater ease of adjustment with lighter weight.

The Drainage of the South Staffordshire Mines.

AMONG the many enterprises which mark the present agitated condition of mining affairs in England, the scheme for the drainage of the South Staffordshire mines occupies a very important place. The whole area of the South Staffordshire coal field is no less than 125 square miles, forming a high table land. It does not receive the drainage of other districts, and apparently should not be a difficult ground to deal with. But, like so many coal districts, its surface is divided by anticlinal ridges into troughs or basins, the coal cropping out along the edges of the hills. This arrangement of the surface, of course, determines the flow of the water to the center of each basin, and the first complication arises in the fact that those who mine in the deep have to do pumping which belongs to their neighbors higher up the hill. The latter have not always proved either just or sensible men, and sometimes not only refuse to share in the cost of draining the deep mines, but also neglect simple precautions to prevent the needless descent of surface water, about which they have no care since it costs them nothing to get it back to the surface. In addition to these difficulties others arise from the fact that South Staffordshire is an old coalfield, with many abandoned pits, and a badly broken surface and dislocated ground. In fact the perpetual sinkings, amounting often to several yards descent, must have completely opened the rock seams, and if the cover of the coal was ever compact it is now very open and leaky. The field was worked before the day of railway transportation, and is intersected by a great number of canals which are notoriously in bad condition. The alteration of the surface by sinking, piles of mine waste, excavations for canals, and embankments for railways has been so radical as to upset the natural drainage of the district. In time of rain, we are told, the brooks spread themselves into lakes or swamps, the canals overflow and the porous ground suffers streams of water to pour into the mines. Instances are known of entire streams discharging into a mine for days and weeks.

The average rainfall is 29 inches a year, but last year 45 inches fell with direful results to South Staffordshire. Many mines were flooded and some painful sacrifices of life were made. At the same time the attention of the English were strongly directed to the increase of their coal supply, and prices rose to a point which gave encouragement to large enterprises. Under these circumstances some engineers who had long been studying the field with a view to its thorough drainage, were able to obtain more general support than ever before. Meetings were held and a bill drafted which has passed the House of Commons.

Mr. E. B. MARTEN, of Stourbridge, has charge of the surface drainage and Messrs. HENRY JOHNSON and DAVID PEACOCK will manage the deep drainage. The first named gentleman estimated in 1865 that of the 50,000,000 gallons of water pumped daily from the mines a very large proportion makes a continual round through the earth into the mine, out by the pumps and back through the earth to the mines again. The water supply of the district is about

112,000,000 gallons, of which 52,000,000 run off by the streams, 10,000,000 gallons by the canals and 50,000,000 are pumped from the mines. Of the latter quantity the canals receive the greater part, or 37,000,000 gallons and natural water course, 13,000,000 gallons. In 1869 the district produced 8,944,395 tons of coal and 350,000 tons of iron ore. The output of ore fell to this figure from a maximum of 727,500 tons in 1861, and in proof that this was not due to commercial causes the fact is mentioned that close on 570,000 [tons of pig iron was made in the district showing an importation of towards one and a half million tons of ore. Some of the collieries raise 25 to 30 tons of water for every ton of coal.

The scheme as proposed in the original bill, which we believe has not been essentially changed, contemplates the division of the region into eight or ten drainage districts, bounded, where possible, by large faults or surface out-crops of coal. The mines within each district are to be divided into four classes: *First*, mines in the outcrop, requiring no drainage, but those which affect the amount of water in lower mines are to be especially distinguished; *second*, mines which require constant pumping; *third*, mines which have been abandoned on account of flooding; *fourth*, exhausted mines. The work of drainage is to be threefold. The surface is to be carefully restored by repairing canals and rivers, filling up marshes and settlings, cutting through obstructions, and similar measures designed to prevent the excessive percolation of water. Next, the top water of the mines is to be intercepted and pumped from the upper levels, this work being enforced upon the owners of each mine. It is expected that these measures will so reduce the water in the deep that the removal of this, which is the only remaining work, will be but a small item, compared to what it is now. The expense is calculated at £125,000 a year, and taxes are to be of two kinds: 1st, a general drainage rate, which is to apply to the liquidation of the first cost of the works; 2d, a mines' drainage rate to defray the running expenses, which rate varies according to the circumstances of each mine. The highest rate which the commissioners can levy in any district for the surface or general drainage rate is on coal, lumps, slack, ironstone, or other mineral, 1d. per ton; and for the mines' drainage rate, coals and lumps, 1s.; slack, 3d.; ironstone, 9d.; and limestone 3d. per ton. This is a maximum, and it is expected that the total cost of pumping will be reduced one-half.

The rates will be imposed by commissioners, of whom there are two classes—general and district commissioners. The general board is composed of six permanent members, who hold office by virtue of their official connection with certain counties, associations and canals; and of twenty-four others, who serve six years, one-third going out every two years. The first commissioners are named by the bill, and, as they retire, new ones will be elected by the district boards. These district boards are elected by the colliery owners, who have one vote for every 20 acres, but no one has more than six votes. It is the duty of the district boards to fix the special or "mines drainage" rate, while the general board decides the rate for general surface work. Each district must meet its own special expenses, and if any dispute arises concerning the rating, it is referred to three sworn arbitrators, one of whom is a barrister and the others are mining surveyors. Appeal is permitted to the general board. The work of the arbitrators is very delicate and important. At a meeting of one of the English technical societies, one of the promoters of the scheme said: "They are to inspect and report upon the drainage requirements of each particular district, the necessary work to be done, and divide the drainage area into districts, the limits of which shall be determined by the physical conformation of the underground basins; classify the mines as to whether those in the crop are being worked to the injury of those in the deep—mines requiring perpetual pumping, flooded mines, and exhausted mines; what existing pumping plant is available, and what new plant required; and to what extent the powers of the commissioners shall be put into force in any particular district. Then the abitrators are to make a draft award, setting forth the districts into which the drainage area shall be divided, the amount of general rate for surface drainage, and the mines drainage rate of each separate district, and what is very desirable, 'the proportion of rate to be borne by the several mines in each district as between themselves, according to the circumstances of the particular mine, or according to the circumstances of the district, or according to both circumstances; and whether such rate shall be temporary or permanent. Such award to be advertised in the public newspapers. * * * * * *

This, then, is a rude outline of the South Staffordshire drainage bill. It seems to be tolerably well agreed that without concerted action the district will suffer great damage. It is estimated to contain 500,000,000 tons of coal and iron ore, of which at least 150,000,000 tons is now inaccessible on account of the imperfect drainage. The promoters of the work justly argue that it is much better to secure known stores of mineral, than to spend money in hunting for untried deposits of coal and ore. The Engineers in a paper read before the South Staffordshire Institute of Mining Engineers, said: "We feel that in bringing this subject before you to-day, it needs little or no apology from either of us, for we consider the members of this Institute could not be more nobly employed than in rendering advice and support in saving the old "Black Country" from decadence and annihilation. We think another 45 in. of rainfall in twelve months would about place this district under water forever, for it must be readily seen that if the cost of pumping the accumulations of water in the more central parts of the coal field outweighs the profits on the minerals, then district after district will be closed only to bring down others, and the total drowning of thousands of acres of good minerals must ensue."

CORRESPONDENCE.

Concentration—Wet or Dry.

TO THE EDITOR:

Sir—In my communication, published in your Journal, September 23d, some mistakes occurred in words and figures which I wish to correct. Near the bottom of page 202 I am made to say, "*deliberate* the enormous losses sustained in treating poor argentiferous ores." It should read, *reiterate* the enormous losses, etc.; and on next line I am made to say, "*wrong* the public with new inventions," etc. It should read, *worry* the public, etc.

Also, the concentration in grade, assayed $1,219, $1,500, $1,660—not as printed: $12.19, $15.00, $16.60 per ton.

Yours, respectfully, S. R. KNOM.

Gruner's Blast-Furnace Studies.

BY THOS. M. DROWN.

THE blast-furnace process is receiving, at present, the attention that subject deserves. No industrial operation presents a more extended and varied field for scientific investigations than that of the reduction of iron from its ore. The results of these investigations are, moreover, such as can be universally appreciated, for they all bear immediately on the important question of cost of production. It is rare to find a technical process the subject of exhaustive scientific treatise, but the magnitude and importance of the iron industry in the world sufficiently accounts for the attention it receives from scientists. Among the latest contributions to the study of the blast-furnace process is that of Prof. GRUNER, of the *Ecole des Mines*, Paris. The result of his studies we translate as follows:

1st. The production of large blast-furnaces, exceeding 200 cubic metres (7,064 cubic feet) capacity, does not increase in proportion to the capacity.

2d. In order to form an estimate of the working of a blast-furnace it is important to determine experimentally the proportion CO^2 : CO in the tunnel head gases. By means of this proportion we can not only calculate the actual composition of the gases, but also the quantity of air that the furnace requires.

3. To determine precisely the proportion CO^2 : CO, it does not suffice to take a number of samples instantaneously, but the gases must be drawn off for several hours.

4th. The composition of the gases being known, it is desirable, in order to exhibit an exact account of the working of the furnace, to strike a balance between the heat *received* and that *expended*, and to estimate separately the heat developed in the zone of the tuyeres and that generated in the zone of reduction.

5th. In applying these principles to some of the Cleveland furnaces, it can be proved that the advantages of high furnaces over low ones result simply from a lower temperature in the upper portion of the shaft. The reduction is accomplished there more thoroughly by the sole action of carbonic oxide without the intervention of solid carbon; approximating to the *ideal* working which supposes the solid carbon to be burnt exclusively by the oxygen of the blast. A subordinate, though more immediate advantage, is due to the less amount of *sensible* heat in the tunnel head gases.

6th. The consumption of fuel in the blast-furnace depends in part on its production. The *minimum* consumption accompanies a *mean* rapidity of working, which varies, moreover, with the height and capacity of the furnace.

7th. On account of the dissociation of carbonic oxide in the upper part of the furnace, the temperature of the tunnel head gases cannot be reduced beyond a certain limit, and, on this account, there is no advantage, where this limit is attained, in increasing the capacity and height of the furnace. Too slow working and an excessive capacity may become embarrassing.

8th. The heat carried by the blast replaces with advantage that developed by combustion in the tuyere zone. The relative economy of the hot-blast diminishes, however, in proportion as the temperature is raised. In practice, the actual economy is slight beyond 700° to 800° C. (1,292° to 1,472° F.). Hot-blast tends to increase the value of the proportion CO^2 : CO; and, in consequence of the cooling of the upper part of the furnace, it facilitates reduction without the consumption of solid carbon, which constitutes the ideal working of the furnace.—*Am. Exchange and Review.*

Competition in California.

THE following is an extract of a letter received on Wednesday from San Francisco by a Sheffield firm engaged largely in trade there:—"We regret to inform you that since our last letter the metal market has become fearfully demoralized. Iron has fallen from 6½ cents to 4½ cents per lb. The source of supply for iron now is wholly from the cities of Pittsburgh and New York. Those engaged in this branch of trade here inform us they have not a single order out for English iron, and none on the way, except some remnants of old orders that were given out before the advance in England. A number of agents from the above named cities are here seeking orders at rates so low, that prices are really in a chaotic state. Agents for cast steel, too, have gone to our friends, and are offering to lay down American best cast steel at 16½ cents per lb, and bar steel at 9½ cents, at the same time parading certificates as to quality, and guarantee that it shall be uniformly good. Such being the case, we are fully convinced that for the present we shall have to continue to sell at the low rate now prevailing."

Prices of Coal for Forty Years.

THE *Bulletin of the American Iron and Steel Association* publishes a table of prices of anthracite coal, the averages of which are complete for the forty years beginning 1834. The *Bulletin* gives the monthly average; but we transcribe below only the averages for each year:

1834	$4.84	1854	$5.19
5	4.84	5	4.49
6	6.64	6	4.11
7	6.72	7	3.87
8	5.27	8	3.43
9	5.00	9	3.25
1840	4.91	1860	3.40
1	5.79	1	3.39
2	4.18	2	4.14
3	3.27	3	6.06
4	3.20	4	8.39
5	3.46	5	7.86
6	3.90	6	5.80
7	3.80	7	4.37
8	3.50	8	3.86
9	3.62	9	5.31
1850	3.64	1870	4.39
1	3.34	1	4.46
2	3.46	2	3.74
3	3.70	3	4.16

Of course, it is impossible now to obtain accurate averages, but dividing the above prices equally among the years, without regard to quantity sold, we have for the first twenty years an average of $4.35, for the second twenty years an average of $4.68, and for the whole term an average of $4.52. Were the quantities sold obtainable, they would show an increasing average of cost commensurate with the enormously increased sales of the later years.

The Alleged Sale of American Iron in England.

THE Liverpool *Daily Post* of the 18th ult. publishes the following letter from Messrs W. S. & N. CAINE, explanatory of the story that 100 tons of American bar iron had been sold in Liverpool at a price below any for which English manufacturers could supply a like article:

SIR—We notice that the article which appeared in your paper of Tuesday, referring to the purchase of 100 tons of American bar, has been extensively referred to by the English press. We think it our duty at once to inform you of the whole facts from the commencement, so that those who are interested in the question may be enabled to judge fairly and impartially of the whole merits of the case. On the 19th August last a respectable house in this town informed us that they had received a letter from a firm of iron merchants in New York, to the effect that they were desirous of exporting to this country a quantity of American bars, feeling assured that the quality and price would be such as to induce English buyers to import American iron. There having been considerable discussion in the trade, both on this side and in America as to the surprising cheapness with which the American ironmasters could produce their iron, we determined to test the matter by purchasing 100 tons at £11 10s. per ton, delivered here—five shillings less than the ruling price here. The order was accepted by the agent, although at the time we had very little confidence that it could be carried out; so much so that we requested him to ask for a confirmation by cable if the order was not accepted. This, however, was never received. On Monday last, on the arrival of New York papers bearing dates 1st, 2d, and 3d inst., we found a series of articles relating to the iron trade of the two countries, and a statement of the fact, in the New York *Times* of the 3d, that Messrs. JACKSON & CHASE had accepted an order of 100 tons of merchant bar iron from Liverpool. From the time we made the purchase up to last Monday we had carefully abstained from making it known, not wishing to do so until we had actually received the iron, although we had mentioned it privately to several friends in the trade. When the New York papers were received here, and the articles read, the secret went out of our keeping, and became a subject of talk on 'Change, as it then became known that our firm were the purchasers. This morning, however, the gentleman who sold us the iron received a letter from his principals, Messrs. JACKSON & CHASE, of which the following is an extract:

NEW YORK, Sept. 6.

Your letter dated 21st ult. duly received, and we have delayed reply to see if we could meet your figures. Although prices are low with us, and we are anxious to fill an order for your market, yet it could not be done at £11 10s. without some loss. We regret not being able to execute your order, but will keep you advised of the probabilities of being able to meet your views. There has been no small stir in our city since it came out that we had got an order from England for 100 tons of iron. All sorts of rumors have been flying about, and the newspapers got hold of it, and there has been much discussion on the subject. While we would be pleased to make such a shipment, we do not anticipate being able to do so unless prices are maintained on your side and go down on this. It is not to be expected that the condition of the trade should hold so that any extensive shipments could be made to England for some time to come. But your people should not forget that ours is a remarkable country in the matter of resources for iron production, and the home competition will keep the prices at reasonable figures in the absence of any extraordinary demand, and such we have not now by considerable.

You will note that the transaction was published and commented on by the American press on the 3d inst., but Messrs. JACKSON & CHASE'S letter bears date the 6th inst., allowing the New York papers to reach England, and extracts to be made from them into our papers three days before their letter came to hand. Had Messrs. JACKSON & CHASE cabled the refusal of the order, or even written by return mail, there could have been no possibility of any misunderstanding. Upon the general question, we may state that houses in England have been offered, during the last few months, English iron in bond, at New York, at prices which would leave a profit to bring back to this country. Whether we ever receive this 100 tons of iron or not—and there is no doubt we have purchased it—one thing is certain that the American iron trade has gone from us, and if their manufacture increases during the next two or three years as it has done in the last, there can be no doubt that the whole of our North American iron trade will follow. As a matter of personal explanation, we are prompted to say that we have not courted publicity in this matter, and should have much preferred that no notice had been taken of the transaction until the iron had reached the shores.

The Copper and Sulphur Resources of the South.

DR. T. STERRY HUNT has contributed to the New York *Tribune* some interesting letters upon the mining resources of the Blue Ridge and their importance in the development of the South. We say the Blue Ridge because the region of which he particularly speaks is yet unnamed, but it really lies between the Blue Ridge and the Great Appalachian Valley. He says:—"Its great mineral wealth is likely to lead before long to a further development of this region. A brief notice of some of its mineral deposits will not, therefore, be out of place. I might speak of the numerous beds of iron ores of the magnetic species, some of which, from the descriptions given, and from the specimens which I have seen, are very similar to those of Lake Champlain. In some localities these ores are treated in small forge fires, and made to yield bar iron for the wants of the immediate neighborhood. The abundance of fuel in these mountains, and the cheapness of labor, would make it easy to produce charcoal iron here at lower rates than perhaps anywhere else on the continent, but until railways are built such an industry must remain unprofitable. I prefer therefore to notice at present the copper mines, for the reason that some of them have already been opened and mined with great success.

"The mines of Ducktown, in the south-eastern corner of Tennessee, have now been known for nearly twenty years, and were vigorously worked before the war, after which came a time of depression caused by the very low prices of copper. Within the past few years, however, the considerable rise in the price of this metal has given fresh stimulus to the mining industry of Ducktown, and under the efficient management of Mr. JULIUS E. RAHT and his brother, Mr. AUGUST RAHT, the works are in a very flourishing state. Ducktown is reached from Cleveland on the East Tennessee Railroad by a wagon road of 40 miles, in great part through the hills and along the valley of the Ocoee River, a wild mountain stream of great beauty. The mines themselves are on a plateau about 1,500 feet above the sea level, and are situated on three great lodes in close proximity to each other. At an early period in the history of this region, these mines were owned by several companies, but within a few years the greater part of them have been combined in what is known as the Union Consolidated Mining Company of Tennessee, which, besides its mines, has dressing and smelting works, by which the ore, formerly exported, is now smelted and converted into ingot copper on the spot. We may pass over the history of the early working of the various mines, and the rich superficial deposits of ores which they yielded for a long time. These were, however, succeeded in depth by ores which, though less rich, are doubtless destined to be uniform in character, and will insure the permanence of mining operations at Ducktown. The production of ingot copper from the works at Ducktown, in 1872, was about 750 tons, or 2,500,000 pounds. This was extracted in greater part from a single opening, known as the East Tennessee mine, which has been wrought to a depth of over 400 feet. The revived state of the copper trade is leading to more extended mining operations at Ducktown, and the production will this year be greatly increased, not only by further openings at the mine just mentioned, but by similar works at the other mines in the immediate vicinity. It should be said that after the first workings had removed from these mines ores rich enough for shipment to the seaboard, the great deposits of lowgrade ores, fit for smelting on the spot, were neglected, but now when their value is fully understood, it is found that the district is capable of yielding large quantities of such ores. The lodes are of great thickness, but are not everywhere of equal richness, and to determine the portion best fitted for working, an ingenious use is made of the annular diamond drill. This, as your readers are aware, drills rapidly into the hardest rocks, removing a cylindrical core, which gives a section of the ground traversed. By this means the great lodes, which dip to the south-west at a considerable inclination, are traversed at right angles, and are shown to contain bands of valuable copper ores interposed among portions which consist chiefly of sulphur and iron. These explorations were still in progress at the time of my visit last month, but had already given most gratifying results.

"The ores here mined contain, when selected, about six per cent of copper, but large quantities when raised from the mine do not contain more than one half that amount. These latter are crushed, stamped, and concentrated previous to smelting. I need not describe the various steps of the somewhat complicated process by which these ores, consisting of a mixture of sulphurets of copper and iron, are reduced to the state of fine copper. It may, however, be stated that the fuel here used in the various operations is wood, and that to convert 20 tons of the low grade ores into a ton of ingot copper, about 40 cords of wood (in part as charcoal) are required.

"The advantages offered by a great deposit of very rich ores, like those of Ore Knob, are enormous, but it must not, however, be supposed that the mining of low-grade ores is unprofitable. By far the greater part of our copper is extracted from ores scarcely richer than those of Ducktown. The republic of Chili furnishes to-day more than one-half of the copper of the globe, and this is chiefly

produced from ores yielding from six to eight per cent of copper. The great Tomaya lode in that country yields annually about 8,000 tons of fine copper, which is extracted from a sulphureted ore averaging only eight per cent, and the average of the Cornish ores is much less.

"Many of the low-grade copper ores are like those of Ducktown, rich in sulphur, and this, though there allowed to pass off into the air, is in other regions a substance of great value. In the shape of sulphuric acid it forms the starting point of the great industries of the soda manufacture and of mineral fertilizers. The native sulphur beds of Sicily formerly supplied the world, but the chemical manufacturers of Great Britain are now independent of this source, since they find a more advantageous supply in the beds of sulphuret of iron and copper of Spain, from which more than half a million tons are annually shipped to England. These ores, when burned in proper kilns, yield from 35 to 40 per cent or more of sulphur in a form fitted for the making of sulphuric acid; while from the residues a portion of copper amounting to two or three per cent is extracted with profit, leaving behind a valuable ore of iron. The profits of this industry are enormous, and the demand for sulphur ores in Great Britain is daily increasing. The great success of the Tharsis Company, which has hitherto controlled the trade in Spanish sulphur and copper ores, has led to the organization in London of a new company, the Rio Tinto, with a capital of £2,250,000 sterling. It proposes to construct a railway of fifty miles to the sea coast in Spain, and to ship yearly 500,000 tons of sulphur ore, upon which the profit is estimated at £775,000. Large quantities of the sulphur thus brought from Spain into England are used for the treatment of the phosphates of South Carolina which are shipped to England for the manufacture of fertilizers.

"It may well be asked, Why do not our manufacturers imitate the example of the English and substitute the sulphur ore or pyrites for the native sulphur of Sicily? The answer is easy. Available deposits of pyrites suited for the purpose are not accessible. For many years manufacturers of acid in the vicinity of New York have drawn limited supplies of sulphur ore from the provinces of Ontario and Quebec, and from Vermont, and to-day a similar ore is brought from near Richmond, Va., to Philadelphia, there to treat the South Carolina phosphates and convert them into fertilizers, which are destined for the Georgia market. The Vivians, great copper smelters of Swansea, in Wales, manufacture yearly some 60,000 tons of fertilizers, or more than the entire manufacture of Charleston, S. C., from the waste sulphur from their copper ores, and the sulphur which goes to waste this year in Ducktown would, if converted into sulphuric acid, produce as large a quantity. Why then, it may be asked, is not this valuable product utilized? Simply for the want of communications. A mountain barrier, traversed by no railroads, stands between this precious deposit of sulphur ore and the mineral phosphates of the coast of South Carolina. Were these two more accessible, the one to the other, the value of both would be greatly enhanced, and the benefit to Southern agriculture would be immense.

"That this desirable conjunction will be one day realized there is little doubt, the more so, as recent investigations indicate that the deposits of natural phosphates in South Carolina are practically inexhaustible. Meanwhile other and more accessible localities invite attention. The conditions of Ducktown are reproduced in Southern Virginia, where, in Floyd and Carroll Counties, are great lodes of iron and copper pyrites, which, previous to the war, were mined like those of Ducktown, and yielded large quantities of rich ore. When the low-grade ores beneath were reached the mines were abandoned, and, unlike those of Tennessee, have not been re-opened. From a recent examination of the lodes in Carroll County, there seems every reason to conclude that if the same skill and capital were applied there as at Ducktown, the mines might be made to yield as large an amount of copper under conditions much more favorable for working and shipment, than in Southeastern Tennessee. These ores contain as much sulphur as those of Ducktown, and inexhaustible supplies of pyrites rich in sulphur, and holding more or less copper, like those of Spain, can be mined. A railway of 17 miles would connect these mines with the Virginia and Tennessee Railroad at a point 125 miles from Lynchburg, the head of water communication. At this point, at Norfolk, or at Charleston itself, these sulphur ores will one day be brought in contact with the South Carolina phosphates. The sulphur, the copper and the iron of these ores will be utilized, as is now the case with the Spanish ores in England, and the phosphates converted into fertilizers not only for our own soils, but for shipment abroad. I have spoken thus of the copper and sulphur deposits of Carroll County because their greater accessibility points them out for more immediate development, and will permit their accompanying sulphur to be turned to advantage. The deposits of Floyd County are, however, probably not less worthy of attention as sources of copper, and others doubtless await discovery.

English Rolling Mill Plant on Ramsbottom's Plan.

THE Clydesdale Iron Works were commenced in the year 1871, with the intention of making boiler and ship plates and sheets for boiler tube strips exclusively, and since the works were started nothing else has been made. The enterprise of the firm led them to the adoption of several novelties in the iron manufacture, chief of which was the Gorman furnace, which they employed both for puddling and heating purposes. This has been a great success with them, but, like many other scientific appliances, it requires to be very carefully watched, or it ceases to be a means of effecting any economy. But the most characteristic feature of the Clydesdale Iron Works is the reversing rolling mill.

This rolling mill is the first application of the Ramsbottom system in Scotland, the special feature of which is that the reversal of the motion of the rolls is effected by reversing the pair of engines by which the rolls are driven. It consists of two pairs of rolls, roughing and finishing, seven feet long by twenty-five inches in diameter, which are worked by a pair of engines of 34-inch cylinders and 4-feet stroke, and upwards of 400 horse-power. They are provided with the well-known gridiron slide-valves, worked by Allan's patent link motion, and reversed by a small engine having a cylinder of 8 inches diameter. The reversing action is effected by hydraulic power, without shutting off the steam, and the wheel gear is arranged in the ratio of about 3 to 1 for speed. The engines can be made to run 80 strokes a minute, and still be under easy control, and there is no difficulty in reversing the gear as often as fifty times a minute, while the engines can also be made to run as slow as one revolution per minute. The bed plate on which the engines are fitted is about eighteen inches deep, and is a ponderous mass weighing nearly thirty tons. It is of the box-girder form, and rests on a very secure foundation of brick and Portland cement, with iron bracing. These engines are of such power that there is no necessity to do more than just start them before the "heat" enters the rolls. Thus the heavy and massive fly-wheel usually employed, and frequently weighing 40 or 50 tons, is not required, and consequently the engines are easily reversed; neither is there any expenditure of steam except at the very time of rolling. The new rolling-mill has been three or four weeks in constant operation, and its powers have been well tried. It is found to be possible to pass 25 tons of iron through it per shift of twelve hours, the plates, when finished, being 74½ inches broad, 11-16 inches thick, and from 12 to 16 feet in length. The engines have never been stopped for a moment for repairs or alterations.—*Glasgow Herald.*

The Commission on Steam Boilers.

THE Commission appointed by the United States government to inquire into the causes of steam boiler explosions, in order to determine by actual experiment the best form and construction of safety valves which shall operate automatically in relieving steam boilers from the pressure of steam, or with certainty automatically prevent any increase of pressure above that at which the valve shall be set, invite persons claiming to have valves of superior efficiency to submit one to the Commission for examination and testing. All valves presented must have an area of exactly five square inches in their discharge-openings, and the flange for attaching it to the boiler must be eight inches in diameter, flat face, without bolt holes. At the meeting of the Commission to inquire into the causes of steam boiler explosions, held at Washington, it was resolved to issue a call upon those who may be conversant with facts bearing upon that subject to forward such information to the Commission. The following will probably cover most of the opinions and theories entertained by scientists and engineers on the subject: First, explosions caused by the gradual increase of steam pressure; second, those caused by low water and overheating of the plates of the boiler; third, those caused by the deposit of sediment or incrustation of the inner surface exposed to the fire; fourth, those caused by the generation of explosive gases within the boiler; fifth, those caused by electrical action; sixth, those caused by the percussive action of the water in case of a rupture of the boiler in the steam chamber (Clark & Colborn's theory;) seventh, those caused by the water being deprived of its air; eighth, those caused by the spheroidal condition of the water; ninth, those caused by the repulsion of the water from the fire surfaces or plates. The Commission intends to experiment as to the truth or fallacy of these various theories, and to that end will give its earnest attention to any communications made to them upon the subject, which should be addressed to Mr. TAYLOR, the Secretary of the Experimental Commission, at the Treasury Department, in Washington.

Coal in England.

THE discoveries of coalfields in every part of the world have rather been the result of chance than of scientific research. Our ideas as to the existence of coal have at various times been proved to be erroneous. The most careful geological studies have been found to be in error; and predictions derived from principles which were supposed irrefutable have turned out wrong. In such researches as those concerning the geological formation of our globe a great proportion of the deductions must be founded on supposition—must be rather theories than established conclusions. Without impugning the general excellence of our geological knowledge, we may still argue that in many details it may be incorrect. Systems which embrace large fields of knowledge, though in the main just, are still liable to error in minor details. It is for these reasons we cannot concede at once that our coalfields are limited to those areas which have been assigned to them, or that because science would seem to say coal cannot be found in any certain place it must necessarily follow it will not be so. A coalfield which has been surveyed and carefully examined may with a great degree of certainty be defined, and its limits fixed; but experience shows that, contrary to expectation, new fields have been found in districts where their existence was not even suspected. We may thus look forward to fresh finds in our own island, and though the results of Viscount Hill's borings in the Preston Hospital Estate near the Wrekin and at Wollerton were discontinued because they had reached igneous rocks, it is still possible that, had they been continued, coal might have been arrived at. In the well known case of the Clee-Hill Collieries, though at a great altitude, the beds of coal are covered with a thick stratum of basalt. The liquid lava had in this case been ejected from an orifice situated in the Titterstone

Clee-Hill, which can even now be clearly traced. When this took place the coal was not as now, high perched on a hill. It has since been elevated by a movement of the earth's crust. Had it remained buried, it is more than probable that a rich and valuable field would have been ignored, and its basaltic covering have been considered as proof that it could not exist underneath.

Failures such as these we have noted must not discourage us, nor must that at Child's Escol in the north of Shropshire, It is true that the large costs which have to be incurred are a great obstacle in the way of such enterprises; but it ought to be remembered that the depths of 1,100 feet in the latter instance and 300 and 285 feet in the previous ones are not peculiarly great in coal mining. In the basin of Saarbrück the coal measures extend to a depth where to work them would be impossible. Their existence, however, has been proved beyond doubt, and in our own islands coal deposits are known to exist many thousands feet below the surface of the soil. Faulty as the mineral ground may be, it is most improbable that the South Staffordshire and Shropshire coalfields should be entirely disconnected; and though denudation may have taken place on many parts of it, there are, doubtless, connecting points rich in coal. A survey of the South Staffordshire mineral field will show that even amidst all its richness there are poor portions. There are also many instances of coal being found under basalt, and even sometimes, as in the case of "Rowley Regis," or "Rowley Rag," the beds of coal have been followed below the mass till at length they become blackened, charred, and utterly worthless. The trial now being made by the Cannock and Huntingdon Colliery Company will greatly tend to set at rest the question of the continuity of the measures into Shropshire.—*Mining World.*

Spanish Iron Trade.

THE iron ore trade between Great Britain and the North of Spain has been steadily increasing for many years past; but within the last two years the growing demand in England for iron ores furnished from the mines in the immediate neighborhood of Bilbao has received a great stimulus. Since, however, the iron stone mines have fallen into the hands of Don Carlos, this branch of Spanish production has been at a standstill. The extent of the check to the prosperity of Spain, and of the loss to the British iron trade, resulting from this circumstance, may be inferred from the following statistics which have been published, showing the growth of the imports into Great Britain of iron ore from the Peninsula during the past five years:—1872, 631,134 tons; 1871, 302,382 tons; 1970, 179,085 tons; 1869, 99,816 tons; 1868, 88,770 tons. The recent growth of this importation had been even more surprising lattely than in the years named above. We understand that two Sheffield houses alone had recently arranged for the importation of 1,000,000 tons annually of Spanish ironstone. The sudden arrest of so promising a development of the iron industry of two great nations is not the least serious result of the Spanish civil war. It is not possible, however, from the data furnished, to form an adequate conception of the importance which this trade had assumed. Four lines of railway from the mining districts are now in course of construction, three by English companies and one by a Spanish firm; and, although it is probable that with every effort the actual quantity of mineral exported during the year 1872 would not have exceeded 500,000 tons, in consequence of the limited means of transport, the development of this trade to a point of great magnitude appears to be merely a question of the time requisite to complete the lines referred to. The call in England for the rich and pure ores extracted from the various mines in the Bilbao district appears to be daily augmenting, and the supply is almost inexhaustible, not only the celebrated Somorostro Mountains, but the whole vicinity of the port, being full of mineral more or less rich in quality; and competition will probably obtain its delivery to the British market at a price which will secure the permanent continuance of their trade, despite temporary checks such as it has now experienced.—*Mining World.*

The Fourth Sand Oil Strike.

THE Titusville *Herald* gives the following in reference to the reported confirmation of the "fourth sand" theory: "Great excitement is manifested here over the confirmation of the theory in regard to the existence of a prolific fourth sand. This fourth sand has, so far, been found on the Scott and McAleer farms, in the neighborhood of Karns City. It was discovered on the Scott farm by a man named Charles Stewart, a native of this soil, who accumulated a small capital by mining coal for the different wells. He purchased an abandoned well for $4,000, on the Scott farm, from a man named Banks, and, after vainly endeavoring to make it pay for a period of thirty days, an idea struck him that if there was a first, second, and third sand, there might be a fourth. He started to drill deeper about the middle of last June, and after nearly eight weeks' drilling in daylight, struck the first flowing well in the fourth sand. This well is known as the Banks, or Stewart well, and averages 400 barrels daily. The entire oil community, including the shrewdest operators, scouted the idea of this being the fourth sand, and claimed that the well had not originally been drilled deep enough. Messrs. Tack & Morehead, however, on the adjoining farm, had a different opinion, as they were in possession of the full record of the well. They therefore commenced to drill one of their abandoned wells, known as the McEleer No. 1, about four weeks ago, and struck the fourth sand last Monday, with a good show of oil. They continued to drill until seven this morning (17th September), when the well commenced flowing at the rate of 700 barrels per day. The most experienced operators claim that the fourth sand is only prolific at those points, where a spur branches out from the main belt, and this is evidently the spur of the Modoc belt. This theory will be very fully studied within the next sixty or ninety days, as there is naturally a determination on the part of everybody owning an abandoned or non-paying well to try it. The Wyatt, Fertig and Hammond well was drilled five feet into the sand to-day, and is now flowing at the rate of 1,200 barrels per day. The Jenkins well, on the Jenkins farm, north of Buena Vista and half-way between Karns City and the Troutman well, is flowing 700 barrels per day. The Asa Say well, four miles south of Millerstown, is discovered to be in the stray sand and sixty feet from the third sand."

The Awards at Vienna.

THE following statistics of the awards of merit made at Vienna will give most people a new idea of "international" exhibitions and the business conducted at them:

There are about 70,000 exhibitors. Of this number no less than 26,002 have been awarded a distinction in the form of a Diploma of Honor Medals of Progress or of Merit, Diplomas of Approval (*i.e.*, honorable mention); Medals for Good Taste Fine Arts, and Co-operators.

These 26,002 distinctions are distributed as follows:

421 Diplomas of Honor.
3,024 Medals of Progress.
10,465 Diplomas of Approval (*i.e.*, honorable mention.)
8,800 Medals of Merit.
326 Medals for Good Taste.
978 Fine Arts Medals, and
1,988 Medals awarded to workmen, &c.

Classified as to countries, the distribution is:

1. Austria	5991	17. Roumania	238
2. Germany	5066	18. Japan	217
3. France	3142	19. Brazils	202
4. Italy	1908	20. Greece	183
5. Hungary	1604	21. China	118
6. Spain	1157	22. Egypt	75
7. England	1156	23. South America	44
8. Russia	1018	24. Persia	29
9. Switzerland	723	25. Morocco	20
10. Belgium	612	26. Madagascar, &c.	10
11. Sweden and Norway	534	27. Monaco	9
12. Turkey	470	28. Sandwich Islands	8
13. North America	441	29. Mexico	1
14. Portugal	431	30. Siam	1
15. Denmark	309	31. Turkestan	1
16. Holland	284		

Classified in groups, the distribution is:

Group.		Group.	
I.	557	XIV.	605
II.	2504	XV.	314
III.	1465	XVI.	251
IV.	3555	XVII.	232
V.	4511	XVIII.	599
VI.	584	XIX.	74
VII.	1755	XX.	24
VIII.	741	XXI.	893
IX.	341	XXII.	11
X.	1001	XXIII.	120
XI.	471	XXIV.	
XII.	994	XXV.	
XIII.	1280	XXVI.	1340
		Additional exhibits	302

In Detail the Different Countries Received.	Diplomas of Honor.	Medals of Progress.	Diplomas of Approval.	Medals of Merit.	Medals for Good Taste.	Fine Arts Medals.	Co-Operators' Medals.
1. Austria	66	633	2520	1977	121	124	550
2. Germany	100	630	1951	1820	41	200	324
3. France	83	547	913	940	43	240	376
4. Italy	19	163	867	650	18	97	94
5. Hungary	15	101	816	516	8	25	123
6. Spain	8	117	593	374	7	18	40
7. England	28	169	432	420	13	49	45
8. Russia	20	124	281	362	13	47	71
9. Switzerland	22	92	258	257	3	33	58
10. Belgium	20	86	155	183	6	90	
11. Sweden and Norway	9	57	236	181	..	15	
12. Turkey	2	30	227	174	18	..	19
13. United States	9	72	154	177	5	16	9
14. Portugal	1	36	218	144	..	..	32
15. Denmark	2	27	138	100	9	8	25
16. Holland	6	39	91	109	3	25	11
17. Roumania	1	9	145	68	4	..	11
18. Japan	4	40	72	92	1	..	8
19. Brazils	2	25	77	88	1	..	9
20. Greece	1	7	114	47	1	4	9
21. China	2	10	28	47	3	..	28
22. Egypt	1	6	16	33	5	1	13
23. South America	..	1	33	9	..	..	1
24. Persia	..	2	8	14	..	..	5
25. Morocco	..	1	7	8	1	..	3
26. Madagascar, &c	..	..	7	3			
27. Monaco	..	..	2	3	2	..	2
28. Sandwich Islands	..	..	4	3	..	..	1
29. Mexico	..	..	..	1			
30. Siam	..	..	1				
31. Turkestan	..	..	1				

MINING SUMMARY.

Montana.

CEDAR CREEK, AND ITS MINES.

From the Deer Lodge City *Independent* of Sept. 20.

Eight miles above the mouth of Cedar we came to the dump of MILLER, POWERS & Co's bed-rock-flume, and following it up one and a half miles came to the head of it, where some 8 or 10 men were engaged ground-sluicing, and shoveling in some three feet of gravel, which they think is paying well. Their last clean-up amounted to $1,400 and they expect to make another next week much larger than the first. They hope to reach the rock with the flume before the season closes, when they will be able to work much more advantageously. DICK QUINN, of Washington and Beartown, is a member of the company.

The next company above, JOHN KENEELEY & Co., are running a hydraulic on the bar, right hand side of the creek, and had just cleaned up $860.00 from a cut 45x25 feet. JAMES OSBORNE & Co. are working in the bed of the creek opposite Lincoln, and C. L. MCKAY & Co., and two or three other companies working on the bars, re present all the mining operations carried on below Louisville. Some four or five companies are working between Louisville and Forest. SAM. H. STUART and PETER GIROUX & Co., one mile above Louisville, have the largest claims and are doing well.

At Forest, Messrs. CROKER, THOMPSON & Co. have completed a bed-rock flume and are sluicing off the old bar, some of which has been drifted out, but their prospects for making money are good. From Forest up to some distance above Mayville the creek is wide and from 67 up to 79 the flat is full of shafts, and work is going on night and day. Just how much the claims are paying we did not learn, but from the number of men employed and the large rolls of greenbacks out of which claimholders selected their "little old $6" for the Independent satisfied us that the ground was holding out good as last year. Further up Cedar several parties are engaged completing drains, and one and a half miles above Mayville, Messrs. PEARSON, HARDY & Co. have struck favorable prospects, after more than a year's work. Should they realize their reasonable expectations, a dozen more claims will be speedily opened on the upper end of the creek. At Snow Shoe Messrs. SHEA, MERILL & Co. have a large amount of ground, out of which they have taken $10,000 this year. They recently paid STUART & Co. the sum of $2,000 for their claim, next below them, already worked out, for the privilege of using it as a dump, and expect to take out from $40,000 to $50,000 next year. As many of the residents of Cedar were over at the new mines on Trout Creek, we took the old Sun Rise trail, eight miles over the mountains, and camped on 12 above discovery on Trout, Wednesday evening the 10th, and as Trout creek is attracting much attention, a few items in reference to the new mines will be of interest. Some time in the latter part of August, Messrs. MORSE, FOX & GIBBONS, while prospecting in the vicinity of Trout, discovered pay in a bar about nine miles above the mouth, and immediately prepared for work by setting their sluices and dumping their pay dirt down the bluff some 18 feet through a chute. They have been making from two to five ounces per day, regularly, since they commenced washing, with only from three to four men. The course of the creek through the mountains is almost straight for 20 miles and the bar on which the mines were found seems to have forced the creek out of a straight course for a little distance, and is washed on three sides by water. The opinion seems to prevail among the miners that the bar was once the bed of the stream, and as the gradual wearing down of ages took place, the water found an easier path around the head rock which forms the bed of the bar, leaving enough of its treasures easy of access, to encourage the adventurous miner to seek for heavier deposits in its present bed. With this view the creek was surveyed off in claims of 200 feet each, extending from summit to summit, and on Thursday, the 11th inst., 123 claims has been taken and four large companies had commenced work with a view to thoroughly prospecting the bed of the stream. The laws of the creek require one day's work a week on each claim or the payment of $5 per week into any one of the prospecting companies. This provision of the law enables miners to hold their ground until the creek is tested, at a small expense, and the amount paid in by these not working will enable the prospectors to proceed with the work of development without involving themselves in debt. On No. 12 above discovery, eighteen men are at work; they have a drain race ten feet deep and intensinking with pump and wheel a large cut and are confident they can reach a depth of 25 feet within three weeks. They find a little gold in the gravel taken out of the drain and the gravel becomes a close resemblance to that found on the Bar where pay is found. Three other companies have commenced sinking below discovery, the lower one on No. 72. This company has a favorable looking location and will thoroughly test it at once. The discoveries on Trout have caused but little excitement, owing to the fact that nothing is yet positively known as to whether the creek contains pay or not. But those who have engaged in the work of proving it have strong faith that it will pay. Some gold has been found in almost every one of its tributaries, and up some 25 miles from the mouth, on Freezeout. A company is now engaged putting in a bed-rock flume, and consider the enterprise a paying one, as the gulch has paid well in the past; two men have taken out as high as $700.00 in three days, shoveling into sluices. There is at the present time, about 1500 inches of water in Trout, and the creek is over thirty miles in length. Should it prove good it would furnish employment for from one to two thousand men.

Idaho.

From the Owyhee *Avalanche* of September 20th:

BELLE PECK.—C. S. PECK has leased this mine to Messrs. HENDERSON & EDGERTON, who already have a shaft down forty-five feet on the ledge. The shaft will be sunk considerably deeper in order to give a good chance for drifting and stoping. The ore that is now being taken out will yield from $75 to $200, and upwards, per ton. They are making preparations to build a large shaft-house on the mine, and will soon have things in good shape for winter operations.

CROWN POINT.—Judge GILMORE HAYS & Co., are working this mine which is situated a short distance west of the Belle Peck mine, in Webfoot gulch. They have a shaft down twenty-five feet, showing a well-defined and splendid looking ledge about 2½ feet wide. The ore prospects well in gold.

GLENBROOK.—This mine is owned and worked by Judge MARTIN & Co, and bids fair to develop into one of the biggest little mines in camp. It is situated at the head of Webfoot gulch, a few yards west of the Poorman. They have two shafts, each about thirty feet in depth and are drifting both north and south on the ledge, which is about nine inches wide and extremely rich in fine gold and sulphurets of silver. We saw several prospects of the ore which demonstrate that the owners of the Glenbrook have got a good thing. They are hauling the ore to the arastra, formerly owned by HUMPHREY & Co., and soon expect to make a handsome clean-up.

ILLINOIS CENTRAL.—This mine is yielding ore none of which will pay less than $100, while considerable of it will yield from $500 to $700 per ton. The shaft is now down 100 feet, and stopes are being driven both north and south. The ledge becomes wider and richer the deeper it is worked. It is also getting softer, which is regarded as a very favorable indication on that side of the mountain. Singular looking wash-boulders are found between the casings from which it would seem to have been a crevice of indefinite depth, subsequently filled up with the rich mineral deposit which it contains. The mine is worked by means of a whim, and it is the intention to take out enough ore for another good crushing before the setting in of winter. The Illinois Central is certainly yielding as fine a quality of ore as we ever saw from any mine in camp.

EMPIRE.—This mine is opening up splendidly under the surveillance of Superintendent HOTT. The 1st, 2d, 3d and 4th level drifts are being driven north with all possible speed. The shute of first-class milling ore, which was recently struck in the 2d and 3d levels, still holds and improves as they go north, with every indication of soon striking it in the 4th level drift. But little ore is being taken out at present, as the mills are all busy and consequently could not work it, but by the time that crushing facilities can be had the mine will be in splendid shape to yield plenty of ore.

WAR EAGLE.—They are driving the 5th level drift in that mine and will commence sinking the main shaft next week. No ore is being taken out at present.

MINNESOTA.—This mine is looking as well as ever and yielding about forty tons of ore per day which is being crushed at the Owyhee mill. The Minnesota declared a dividend of $1.50 per share, aggregating $30,000, for August, payable September 12th. This month's dividend will most likely be as much, if not more.

GOLDEN CHARIOT.—This mine continues to yield splendid ore, and dividends are now the order of the day. The August dividend, payable the 10th instant, was $3 per share, aggregating $30,000.

MAHOGANY.—The stopes in the 6th level of this mine are looking better and those in the 7th level continue about the same as last reported. The winze, 240 feet south of the main shaft, is down for the 8th level, and stopes have been started both north and south in fine looking ore. The main shaft is down sixty feet for the 8th level. A patent blower arrived from San Francisco last Thursday, and will be used for ventilating the mine. They have commenced putting up the new boiler which will afford an abundance of hoisting power for some time to come. Superintendent OWENS informs us that he will soon have a set of steam pumps, which will be a much-needed improvement in the working of the mine.

RED JACKET.—But little ore is being taken from this mine at present. The adit level drift will soon be connected with the north shaft where there is known to be a rich body of ore. The main working shaft (known as the Clark shaft) is being put down as rapidly as possible, in order to receive the hoisting machinery which will be running in thirty days, when everything will be ready for extensive operations. It is now nearly twelve months since the Red Jacket was incorporated, during which time entensive prospecting has been going on and a large amount of money expended; and, as no assessment has ever been levied on the stock, we are led to believe that it has paid its own development.

IDA ELLMORE.—Ten stamps are now running on ore from the 10th level of this mine. The pulp assay of the first day's run was $145 per ton. The 10th level south is opened 35 feet, and stoping commenced—average width of vein, four feet. The 10th level north is opened thirty-five feet, showing a 5-foot vein in the face of the drift. The winze is down sixty feet from the 9th level. The amount of ore raised is limited by reason of the insufficiency of the old boiler to run the pumps and buckets at the same time. This difficulty will, however, be remedied by the arrival of a new boiler about the first of next month,, when stopes will be opened in the 10th level north and work pushed vigorously in all parts of the mine.

SOUTH CHARIOT.—Extensive prospecting is still going on in this mine. The main working shaft has been put in most excellent condition and is now down for the 7th level. A drift has been started north which, it is confidently expected, will open up a rich body of ore. The company's mill is running on Golden Chariot ore.

POORMAN.—Owing to the time necessarily consumed in adjusting the documents, the new owners of the Poorman have not yet commenced operations, but, we understand, will be at work in a few days. The tribute work of the TERRILL BROTHERS, at the south end of the claim, has already developed a splendid mine.

J. A. WILSOM has purchased HENRY DARR's interest in the Norfolk mine, which, we understand, will be worked more extensively than heretofore.

Mr. SHIVELY has commenced work on the Boomerang, which is thought to be a continuation of the Poorman south.

THOMPSON & Co. are still working the Idlewild which is yielding fine looking ore.

JOE CROSS has purchased FRANK SCHUSTER'S interest in the Blue gulch hydraulic diggings and expects to realize a fortune next season.

California.

THE CALISTOGA GOLD MINE.

From the *Mining and Scientific Press* of Sept. 20.

We have several times alluded to the St. Helena Gold mine in Napa County, and published extracts from other journals in relation to the mine. Its main peculiarity lies in the fact that it is situated in the Coast Range where we do not expect to find gold in paying quantities. Our friend, W. A. SKIDMORE, recently paid a visit to this mine and as he has had considerable experience in such matters, being a deputy of the United States Mining Commissioner we asked his opinion of the mine, which is more to be relied on than the statement of interested parties. He says: "In the course of my rambles I came upon a veritable quartz ledge—a novelty in the Coast range. It is known as the St. Helena and is situated on the S. E. slope of the mountain of the same name in a formation of porphyry and trachyte. The rock is peculiar in its crystallization and granulation and rather puzzling to one accustomed to the quartz of the gold belt of California and the silver regions of Nevada. But there it is, four to six feet in width, good walls, bold croppings, and all the concomitants of a first class mine, such as would, if situated in Pioche or Washoe, break many a heart and pocket, or make the owner's fortune on the stock board. The quartz carries gold and silver, associated with cupriferous pyrites. Average assays show $20 to $25 silver, and $10 to $15 gold. It was discovered several years since by RICHARD SWIFT, a prospector, who, however, did not think enough of it to take it up until last spring. They now have out 150 tons of fine looking quartz. It is being worked by our irrepressible ALEX BADLAM, in connection with a few citizens of San Francisco, among whom is a well known speculative business man and a member of the board noted for his boldness and sagacity in stock operations. If the St. Helena was not so near home it would create a sensation in mining matters."

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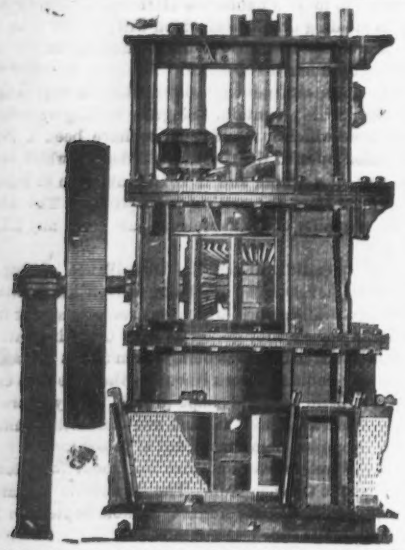

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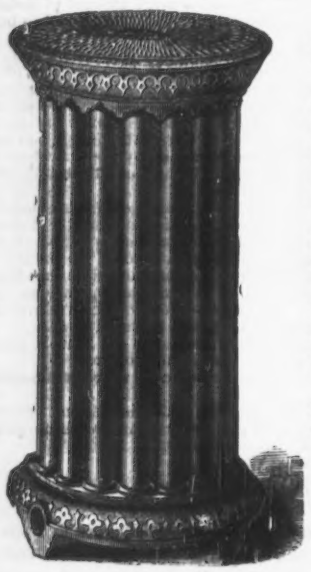

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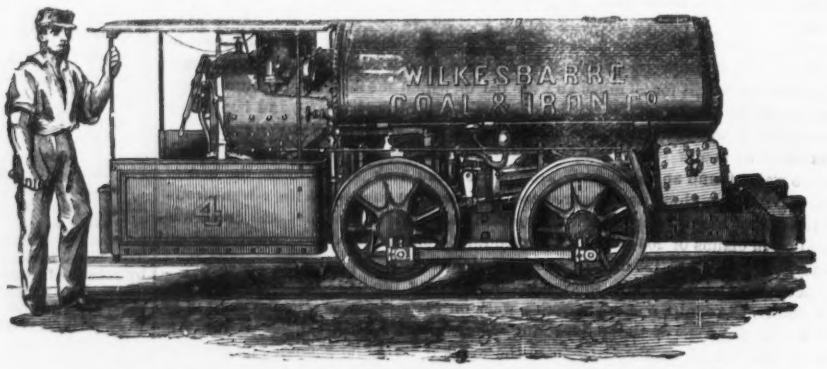

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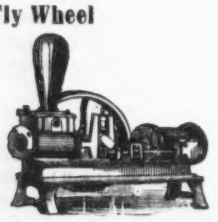

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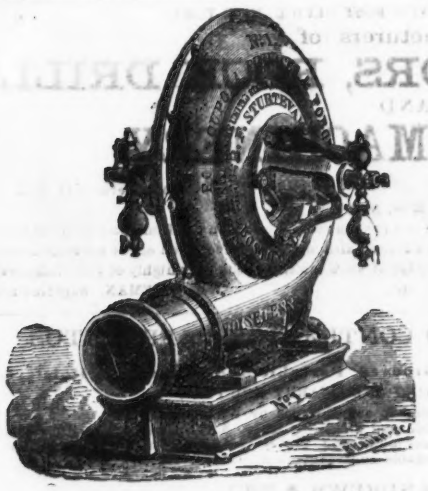

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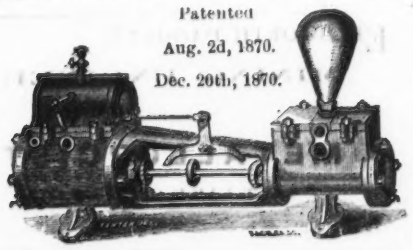

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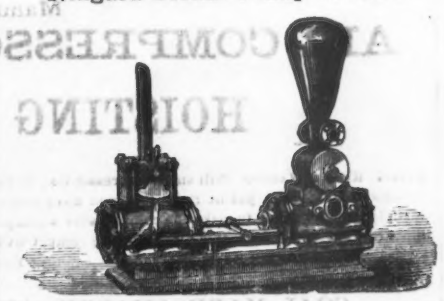

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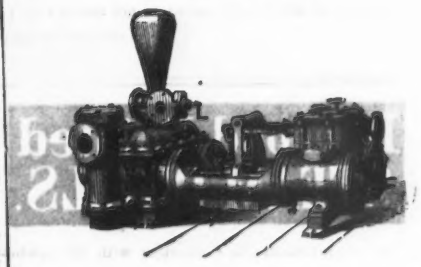

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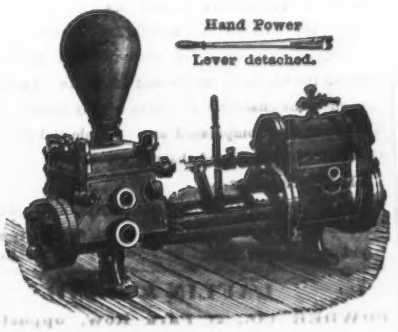

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